

THE EAST MIDLAND  
GEOGRAPHER

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DEPARTMENT OF GEOGRAPHY  
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# THE EAST MIDLAND GEOGRAPHER

## CONTENTS

	<i>Page</i>
Editorial Introduction . . . . .	2
The East Midlands : Some General Considerations . . . . . <i>K. C. Edwards</i>	3
Loughborough: An Outline Urban Survey <i>Gladys H. Wedlock</i>	12
Three Maps on Coal Production . . . . . <i>E. M. Rawstron</i>	21
Geographical Conditions Affecting Grain Milling in the Nene Basin . . . . . <i>J. Smith</i>	24
The Market Garden Industry of the Melbourne District, South Derbyshire . <i>Petra Leay</i>	33
EAST MIDLAND RECORD . . . . .	41
Town Growth in the East Midlands.	
A New Centre of Oil Production.	
A Lincolnshire Village Study.	
Lincolnshire Explorers.	
Geomorphological Work on the Lincolnshire Coast.	
Higher Degree Theses and First Degree Dissertations .	47

## EDITORIAL INTRODUCTION

This journal is a publication of the Department of Geography of the University of Nottingham. From time to time during recent years many requests have reached the Department from teachers, students and others for information, as well as guidance in obtaining information, concerning geographical aspects of the East Midlands. It is hoped by the issue of this journal to do something to meet the need implied by these requests and to stimulate further interest in the geography of the area.

The East Midlands region—using the term in its administrative sense as explained in the first article—is one of great interest in itself for it includes examples of almost every type of landscape and human activity found in the country and provides therefore something of an epitome of the English scene. Its importance in the economic development of the country moreover is continually growing and is likely to increase vastly in the future.

It is intended to publish *The East Midland Geographer* twice a year, in June and December. Its contents will normally be confined to articles, notes and statistics relating to the East Midlands and by providing up-to-date information on current developments it is hoped to keep readers acquainted with changes in the geography of the region. It is also hoped that the contents will reflect, at least as far as geographical work is concerned, the real interest with which the University regards the region in which it is situated.

It is appropriate to mention here the particularly cordial relations existing between the Department of Geography and the regional offices of government departments centred in Nottingham, a circumstance which has led to much fruitful co-operation. To the officers of these departments grateful acknowledgment is made for permission to use official statistics and for the willingness with which advice has been given concerning some of the subjects reviewed in this first issue.

## THE EAST MIDLANDS: SOME GENERAL CONSIDERATIONS

K. C. EDWARDS

The East Midlands as a geographical expression applies most appropriately to that part of the country drained by the middle Trent and its tributaries to which might be added adjoining parts of the basins of the Witham, Welland and Nene. Over this area, entirely indefinite as to boundaries, the term has an accepted currency and a legality accorded to it by tradition. To claim that this area has promoted a "regional consciousness" however, is a gross exaggeration. In any case regional consciousness is a highly subjective concept seldom susceptible to geographical analysis. Human organisations within the East Midlands have nevertheless given the area some measure of functional coherence despite the diversity of physical conditions<sup>(1)</sup>.

To discover the origin of some of the basic elements in the cultural pattern of the East Midlands it is necessary to look far back in history. In this connection, although the numerous Anglo-Saxon farming settlements established in the middle Trent area formed the basis of the kingdom of Mercia, it is to the period of Danish occupation of this area that some of the most significant developments are to be traced<sup>(2)</sup>.

### THE DANISH CONTRIBUTION

After their first sporadic raids the Danes made purposeful incursions along the river routes leading inland from the Humber and the Wash. In 867 one of their bands, having penetrated along the Trent, wintered in Nottingham—mention of this fact in the Anglo-Saxon Chronicle being the earliest record of Nottingham's existence—and five years later others made their winter quarters at Torksey where the Roman Fossdyke canal reaches the Trent from the Witham at Lincoln. In 873 the Danes established themselves at Repton in the heart of Saxon Mercia while other groups were engaged in organising garrisons and trading posts on or near the banks of the other rivers in the area. By 877 Danish strength was sufficient to enforce a partition of Mercia and in the area extending from the Trent to the Nene which included the core of the Anglo-Saxon kingdom<sup>(3)</sup>, the Danelaw was set up.

Gradually the Danelaw was pushed northwards into what is now Yorkshire and southwards into the basin of the Great Ouse, while in the East Midlands its authority was exercised from the five boroughs of Nottingham, Derby, Lincoln, Leicester and Stamford, all located on navigable rivers by which they were made intercommunicable. Northampton was later added to these boroughs (see Fig. 1). Each was a military and commercial centre but not an administrative centre.

(1) The term "functionally coherent" as applied to a region in the geographical sense, is used by Carl O. Sauer in Foreword to *Historical Geography*, *Ann. Assoc. Amer. Geog.*, March 1941, pp. 1-24.

(2) With some justification the East Midlands has long been held to correspond broadly with the earlier confines of Mercia. A reminder of this is to be seen in the arms of the University of Nottingham which incorporates the cross of Mercia ("cross moline gules"), as shown on the cover of this periodical.

(3) It has been suggested that the Trent may have been the first "march" or frontier of the Angles who probably entered the area through the Ancaster gap from the Slea and Witham valleys. The name Mercia is derived from Mierce, meaning "boundary people". See A. C. Wood, *A History of Nottinghamshire*, 1947, pp. 10-15.

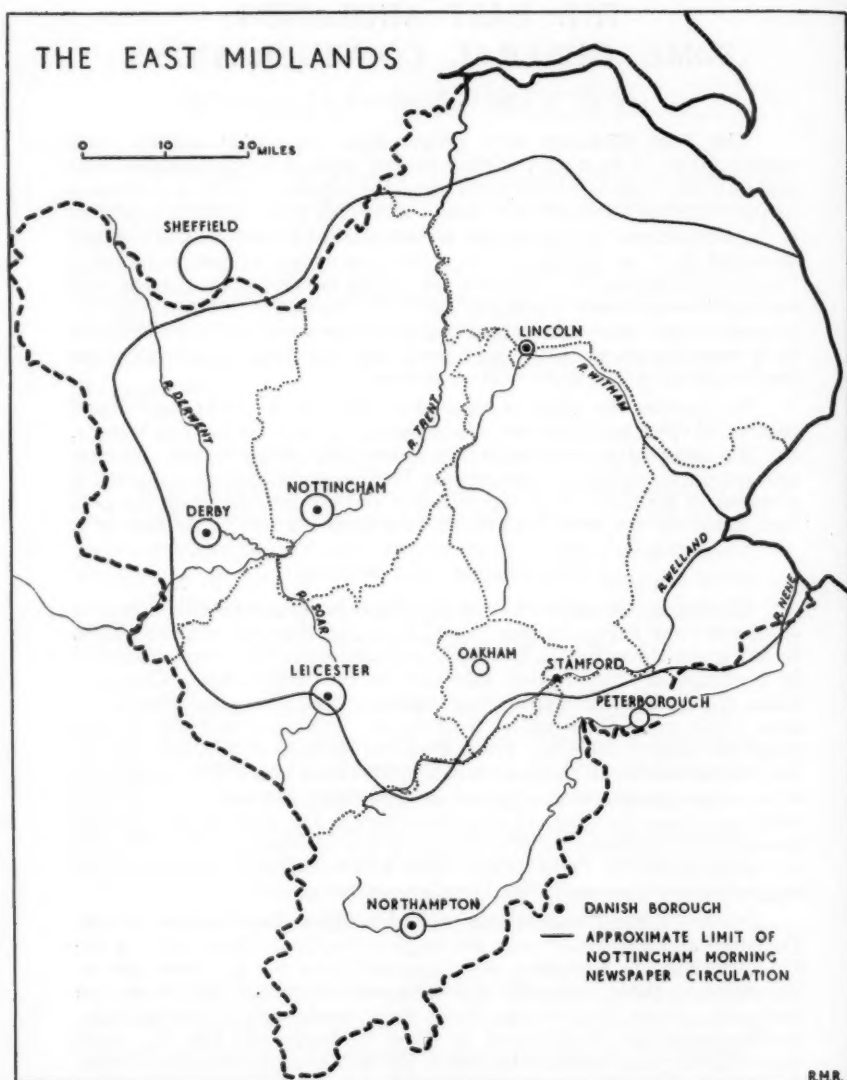


Fig. 11

Each had an earl, who by means of his soldiery ruled over the surrounding country. The development of this group of towns, with their prescribed areas of military rule colonised by new agricultural communities alongside those of Anglo-Saxon origin, was a major contribution to the human organisation of the region. The distribution of present-day villages with Danish place-names gives an indication of the strength of this colonisation which was largely effected by the families of the disbanded Danish

forces. There are many such place-names throughout the East Midlands making the region the most strongly Scandinavianised part of the country. They occur with varying frequency, being particularly numerous around the southern end of the Lincolnshire Wolds (where they outnumber English names), in the valley of the Wreak in Leicestershire and along sections of the Trent<sup>(1)</sup>. But the Danelaw was of relatively brief duration and following its re-conquest by the English early in the 10th century the scheme of urban settlement was rendered permanent by the introduction of a system of civil administration.

The East Midland area was divided into shires like those of Saxon Wessex but each shire in the Danelaw territory was based on one of the boroughs, excluding Stamford, and its area made to correspond with that held previously under Danish military control. The historian Maitland in a frequently quoted passage has expressed the idea with some precision: "The exceedingly neat and artificial scheme of political geography that we find in the Midlands, in the country of the true shires, forcibly suggests deliberate delimitation for military purposes. Each shire is to have its borough in its middle. Each shire takes its name from its borough"<sup>(2)</sup>. Thus were the counties of the East Midlands brought into being, most of them early in the 11th century, their boundaries having remained more or less unaltered ever since.

More important to the geographer perhaps than the establishment of the counties was the impetus given by the Danes to the growth of the boroughs and other towns. Of the original five boroughs only Derby has a Danish name (*Deor-by* = town of the deer) and only Derby and Stamford were actually founded by the Danes, in both cases by the siting of a market centre adjacent to a Saxon village<sup>(3)</sup>. Nottingham, like Northampton, was first an Anglian township, while Lincoln and Leicester were Roman, though their importance had vastly diminished by the time of the Scandinavian influx. The choice of these towns as pivots of county administration, out of which further urban functions naturally grew, made them the leading centres of the region<sup>(4)</sup>. For over a thousand years they have remained as a group forming the basic urban pattern. Though Stamford has declined in importance relative to the others in recent times, its place has in many respects been taken by Peterborough which grew up under closely similar site conditions. Except that Lincoln has been superseded in size by Grimsby, these towns are still the largest in the East Midlands. They are fairly evenly distributed and in terms of population their size-range, from 70,000 to 300,000, is not great. Though Nottingham and Leicester are by far the largest, as cities they are only of medium size and the region is still without a great metropolitan centre such as Birmingham which so completely dominates the West Midlands.

Thus from the area of Danish Mercia with its loose confederacy of boroughs, there emerged, following its re-absorption into the Anglo-Saxon realm some sort of regional cohesion based equally upon a steadily advancing agriculture and the trading activities of the leading towns and

(1) H. C. Darby (Editor), *Historical Geography of England*, 1936, Chapter IV by E. Ekwall, pp. 144-150.

(2) F. W. Maitland, *Domesday Book and Beyond*, 1907, pp. 187-188.

(3) The Saxon settlement at Derby was called Northworthy. Stamford (stony ford) retains its Saxon name.

(4) A stimulus to the growth of commerce in the towns resulted from a law of Edward the Elder (901-925) to the effect that all buying and selling must take place in a market town. See G. M. Trevelyan, *History of England*, 1926, p. 84.

buttressed by a system of administration operated through its shires. It is certainly at this phase that the nuclear area of the present East Midlands can first be discerned. Yet at no time, either then or since, has there appeared a sufficient uniformity or homogeneity of conditions to justify its recognition as a geographical region.

#### THE EAST MIDLAND ADMINISTRATIVE REGION

Today however the term East Midlands demands acceptance as the name for a larger unit which includes the historic nuclear area. This larger unit is one of the eleven regions into which the country was divided for Civil Defence early in 1939 as a measure to safeguard internal organisation in the event of war. The chief purpose of this regional system was to meet the possible contingency of contact between different parts of the country and the central government being broken through enemy action. It provided for the setting up of regional offices of government departments which in extreme urgency could act for the central authority. Since in this matter communications were of vital importance it is not surprising that the scheme of regional division followed closely that of the Traffic Areas adopted by the Road Traffic Act of 1933. In the case of the East Midlands the Civil Defence region was made smaller than the corresponding Traffic Area by the exclusion of Oxfordshire and Buckinghamshire. It was arbitrarily defined as the block of counties embracing Lincolnshire, Nottinghamshire, Derbyshire, Leicestershire, Rutland and Northamptonshire including the Soke of Peterborough <sup>(1)</sup>.

On the whole this regional system served the country well both during the war and in the ensuing period of reconstruction. There is little doubt that it will remain in being for a long time to come and, as an effective instrument for decentralisation, may well become a permanent feature of the national organisation. Its importance to the geographer lies in the fact that national policy in such matters as economic development and town and country planning is now implemented in the light of the conditions prevailing in each region <sup>(2)</sup>.

In the sense just described the East Midlands is an administrative region, while from the geographical standpoint it is a composite unit including many smaller divisions each with its own distinctive character. Being relatively compact and, with some exceptions, satisfactorily served by communications, the region has proved a workable unit from the administrative point of view, though from time to time boundary adjustments have been necessary where marginal districts exhibit closer economic and social affinities with neighbouring regions. Thus part of north-west Derbyshire, including the urban areas of Buxton, Glossop and New Mills, having intimate ties with Manchester and south Lancashire, was transferred to the North Western region. Other boundary problems arise in which close inter-regional co-operation is demanded. These occur chiefly where a town situated close to the boundary exerts an influence over parts of two regions. Sheffield, which now spreads well into Derbyshire is an outstanding example, while Peterborough and Burton-on-Trent are others.

(1) See E. W. Gilbert, Practical Regionalism in England and Wales, *Geog. Journal*, July, 1939. This article contains maps showing various schemes of regional division including the Traffic Areas and the Civil Defence Regions.

(2) See K. C. Edwards, *The East Midlands, a Study in Regional Planning*, 1951.



## EAST MIDLANDS OR NORTH MIDLANDS?

To the geographer the name of the region is of some interest and it seems regrettable that the official designation should be North Midlands instead of East Midlands. "The Civil Defence scheme", observes E. W. Gilbert, "adds another specimen to the collection of strange regional nomenclature with its North Midland region".<sup>(1)</sup> Besides being geographically more appropriate the alternative is justified by long usage. Organisations and institutions having their headquarters in one of the leading centres of the region, as well as regional offices of national organisations, mostly adopt East Midland in their title. The writer put the matter to the test by taking a count of different organisations whose activities were reported in the former *Nottingham Journal*, a morning daily, over the six months July 1st—December 31st, 1948. This showed that of 60 organisations, 49 used the term East Midland and only 11 used North Midland and of the latter, 8 were government departments committed to the official designation. Among the nationalised industries however, the Coal, Gas and Electricity Boards have adopted the traditional term.

### THE REGIONAL CAPITAL

Nottingham was for the most part an obvious choice for the regional capital. By its central location and general accessibility, its advantages as an administrative centre and the multifarious facilities and amenities which a large city provides, it was undeniably suitable. The only likely alternative would have been Leicester, whose claims, except in one respect, must have been almost as great. In relation to population distribution however, Nottingham's main advantage lay in its proximity to the adjoining coalfield and industrial area which, together with the city itself, supports nearly one-third of the inhabitants of the region.

Apart from being the largest centre,<sup>(2)</sup> the city is the focus of numerous economic, social and cultural interests spread over the region and there is no doubt that it exerts an influence over a greater area than any other centre in the East Midlands. To cite but one example, there were until recently two morning newspapers published in the region and both were issued from Nottingham. One of them, the *Nottingham Journal*, founded as early as 1710, had a circulation area extending from central Derbyshire across to the Lincolnshire coast in one direction and from north Nottinghamshire to beyond Leicester in the other. In 1953 the two newspapers were amalgamated and the new daily, known as the *Guardian Journal*<sup>(3)</sup>, now has a circulation area of slightly greater extent (see fig. 1).

Nottingham's importance as a university centre adds further support to its rôle as a regional capital. The former University College, founded in 1881, developed primarily to serve the East Midlands, from which in turn it drew the great majority of its students. Its advancement to full university status by the charter of 1948, attracting students and scholars increasingly from all parts of the country and abroad, confirmed its earlier importance as a regional seat of learning. It is of interest to recall that the late Professor C. B. Fawcett, who was himself closely associated

(1) E. W. Gilbert, op. cit. p. 38.

(2) Population 306,000 (Census of 1951), cf. Leicester 285,000.

(3) The dropping of "Nottingham" from the title, while regretted locally on grounds of historical sentiment, may on the other hand assist the new daily towards recognition as a regional newspaper.

with the former University College, argued the case for Nottingham as a regional capital in a carefully reasoned study published nearly forty years ago.<sup>(1)</sup>

#### REGIONAL RESOURCES AND AGRICULTURE

From the physical standpoint the East Midlands includes a variety of types of country ranging from the Derbyshire uplands with a mean altitude of 1,000 ft., to the featureless levels of the Lincolnshire Fens much of which lie well below 20 ft. above sea-level<sup>(2)</sup>. Equally diversified geological conditions account for a variety of mineral resources, the chief of which are coal, iron, limestone, gypsum, and brick, pottery and pipe-making clays. Coal and iron are of outstanding importance. The resources of the main coalfield, to which reference is made later, are supplemented by those of the small South Derbyshire and Leicestershire field. With regard to iron, the most extensive ore deposits known in Britain occur discontinuously and at varying horizons in the Lower Jurassic formation from north Lincolnshire to Northamptonshire and beyond. Large scale exploitation is carried on in the Scunthorpe district (north Lincolnshire), in east Leicestershire, Kesteven and Rutland and above all in mid-Northamptonshire.

Soil conditions naturally vary over such a large area and, among other factors, are important in determining the many different types of agriculture found in the region. In the absence of rugged country and other unsuitable types of land, agriculture occupies a high proportion of the total surface of the East Midlands. The tract of high quality land forming the Lincolnshire portion of the Fens embraces a large part of the most intensively worked arable area in the country, where over 75% of the acreage is under the plough. Elsewhere different forms of mixed farming prevail, in which permanent grass is generally predominant and attention mainly devoted to milk production. Dairying is also the chief activity on the limestone pastures of the Derbyshire uplands as distinct from the gritstone pastures which are far inferior, but it is especially prominent on the red marls of lowland Derbyshire between the Derwent and the Dove. The relatively heavy soils of the Vale of Belvoir, east Leicestershire and the adjoining parts of Rutland and Northamptonshire are renowned for their fattening pastures, the whole area forming part of the famous 'Midland grass counties'.

On the medium-light arable soils in the eastern half of the region grain production is accompanied by sugar-beet as one of the leading cash crops and six out of the seventeen sugar factories in the country—at Brigg, Bardney, Spalding, Colwick (Nottingham), Kelham (Newark) and Peterborough—are located in this area.

#### DISTRIBUTION OF INDUSTRY

The most important single factor in the industrial development of the East Midlands has undoubtedly been the presence of the great coalfield usually known as the Yorks, Derby and Notts. field. While the division of the field into two parts, a northern (Yorkshire) and a southern (Derby and Notts.) by the National Coal Board for regional administra-

(1) C. B. Fawcett, *Natural Divisions of England*, *Geog. Journ.*, Feb. 1917, pp. 124-135.

(2) For a systematic account of the physical conditions, see H. H. Swinnerton, *The Physiographic Sub-Divisions of the East Midlands*, *Geography*, Sept. 1929.



tive purposes is unfortunate from the geographical standpoint, it is upon the southern division that industrialisation in the East Midlands has always been mainly dependent.

Along the western margin of the field the Coal Measures were formerly rich in iron ore and the proximity of ore, fuel and limestone for flux resulted in the location of iron-producing centres in east Derbyshire during the period when the industry relied upon this source of ore. Chesterfield, Staveley, Clay Cross and Stanton remain as important blast-furnace centres but, the Coal Measures ore having long been exhausted or uneconomic to work, they are now dependent upon the abundant low grade ore from Northamptonshire and other sections of the Jurassic ironstone belt. Smelting-centres are located on the latter at Wellingborough, Kettering and Corby, together with another near Melton Mowbray. These in turn receive their coal and coke from the coalfield with which they are linked by main lines of the former Midland Railway passing through the region from London to Sheffield and the North.

Lying between the coalfield and the ironstone field and served by the same railways are the three largest manufacturing centres of the East Midlands, Nottingham, Derby and Leicester, together with smaller towns such as Loughborough and Long Eaton. The facility with which their basic needs of coal and iron could be obtained has been of fundamental importance in their industrial growth. Thus industrial development has taken place with varying intensity along an axis running southwards through the coalfield, thence across the Trent and south-eastwards to mid-Northants.

On the coalfield itself the leading industries, apart from mining and iron production, are engineering (with some heavy engineering), hosiery and knitwear, pottery and glass-making and general manufacturing. Nottingham, Leicester and Derby are all noted for their wide range of manufacturing. Nottingham ranks as the largest centre in the world for the production of machine-made lace, an industry strongly localised in Nottingham itself and the neighbouring centres of Long Eaton and Beeston. Leicester is the leading centre of the hosiery and knitwear trade with Nottingham only a little less important, this industry being less localised and occurring in many smaller towns from Mansfield in Nottinghamshire to Hinckley in Leicestershire. The textile and engineering industries of the middle Trent area owe much to a long tradition of invention and skill among pioneer workers, while the factor of individual enterprise accounts for specialised production to an unusual degree. The latter is well demonstrated by the rise of such firms as Players (tobacco) and Boots (chemicals) in Nottingham and Rolls-Royce (motor and aircraft engines) in Derby.

At the southern extremity of the main industrial axis the manufacture of footwear is the leading activity, for which Northampton, Kettering, Wellingborough and Rushden are the chief centres. Leicester however is also a highly important centre, specialising largely in women's and children's shoes, whereas Northamptonshire produces mainly men's footwear.

The transport of coal and iron by railway also provided the means by which, from the middle of the nineteenth century onwards, industrial development took place in the more important market towns of the agricultural areas in the eastern part of the region. Thus the production of farm machinery and equipment became a characteristic activity at

Peterborough, Grantham and Newark, all situated on the main line from London to York and at Lincoln, Gainsborough and Stamford. Although other industries associated with agriculture eventually sprang up in these towns, agricultural engineering served as the basis for the more specialised forms of engineering for which they are all noted today.

The other industrial districts of importance in the region are those of north Lincolnshire. These include Scunthorpe, now one of the country's major steel producing centres and Grimsby and Immingham, the only deep-water ports of the East Midlands. The growth of Scunthorpe results from the exploitation of the low grade Jurassic ironstone in the neighbourhood and the accessibility of south Yorkshire coal and coke. Since too much of the crude steel produced—about one-eighth of the national output—is sent to Sheffield, the regional affinities of the district are as much with Yorkshire as with the East Midlands.

Neither Grimsby, with its fish trade and ancillary industries, nor Immingham Dock, with its limited coal exports, functions on a large scale as a regional port. Although this may be partly due to restricted capacity in the case of Grimsby, it is mainly because East Midland manufacturers find it preferable to use major ports such as London, Liverpool and Hull. The introduction of new industries, chiefly chemicals and fertilisers, at Immingham Dock and along the Humber shore towards Grimsby in accordance with Board of Trade post-war policy for the region, is designed to absorb local reserves of labour partly made available through the decline in the fish trade and general commerce<sup>(1)</sup>.

#### SPECIAL SIGNIFICANCE OF THE COALFIELD

Reverting to the East Midland coalfield, it is necessary to recognise its importance to the country as a whole as distinct from the region. Owing to inherent advantages which cannot be dealt with here, the field has an exceptional record of productivity and is the only one in the country in which the annual output has continued to rise from pre-war years to the present time. Production at the rate of some 44 million tons a year is now over 20% of the national total. Of all the coalfields moreover it contains the largest known reserves, so that its future importance is likely to increase rather than diminish<sup>(2)</sup>.

Being an inland field, producing chiefly industrial hard coal and domestic coal, the output is directed mainly to the home market which includes the Midlands, the London area and the South. In recent years however, the coalfield has come to have a new significance from both the regional and national points of view. For the programme of expanding the country's electricity supply as planned by the British Electricity Authority includes the building of a series of large generating stations on the banks of the Trent. These stations, of which several are already in operation, will be fuelled from the nearby coalfield, each consuming at least 25,000 tons a week. In this way the Notts. and Derby coalfield will eventually assume a new rôle in the provision of power resources and as E. M. Rawstron has shown, when completed this scheme may well prove to be "the balance-staff of electricity production in England"<sup>(3)</sup>.

(1) See *Board of Trade Journal*, Dec. 27th, 1952, p. 11.

(2) See *The North Midland Coalfield* (Regional Survey Report, Ministry of Fuel and Power). H.M.S.O. 1945.

(3) E. M. Rawstron, *The Distribution and Location of Steam Driven Power Stations in Great Britain*, *Geography*, Nov. 1951, pp. 249-262.

## FEATURES OF THE REGIONAL ECONOMY

Upon the basis of its resources and human enterprise the region has thus developed a wide range of economic activities giving rise to a marked diversity of production. From this diversity as shown in Fig 2 certain forms of industrial activity such as mining, engineering, textile manufacturing and clothing (especially footwear) stand out clearly as the leading pursuits. In some of the latter, production in the East Midlands leads the country. Thus in terms of insured workers, the region accounts for 64% of the total engaged in lace-making, 61% of those in the hosiery and knitwear trade and 54% of those in footwear. About 14% of the total number employed in coal mining and 11% of those in iron and steel production are found in the region<sup>(1)</sup>.

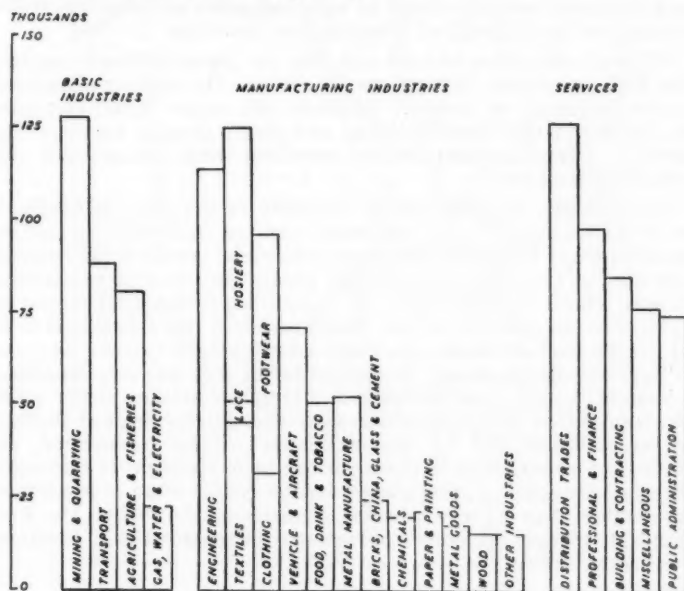


Fig. 2

East Midlands insured population in the main Occupational Groups, 1953.  
(Based by permission on Ministry of Labour and National Service statistics.)

This well balanced economy is of great advantage to the life of the East Midlands, for in general it is a prosperous region suffering little from unemployment. One reason for its stability, in addition to the diversity of output, is the high proportion of consumer goods directed to the home market, for which there is a relatively constant demand. On the other hand many industries contribute to an important degree to the export market, development in this direction having substantially increased in post-war years. Most parts have in fact been spared the more violent fluctuations of trade which have beset other areas of the country in recent times. It is shortage of labour rather than unemployment which tends to impede industrial expansion in some districts. This is especially true in

(1) See articles on The Production Drive in New and Traditional Industries in the North Midland Region, *Board of Trade Journal*, Nov. 29, Dec. 13, Dec. 27, 1942 and Jan. 3, 1953.

areas where the co-existence of mining, engineering and occasional heavy industry with textiles, clothing and other 'light' trades provides a satisfactory balance between male and female workers and favours full employment.

The East Midlands was fortunate in its comparatively rapid return to normal production following the war, for its contribution in industrial output was of major importance to the nation. The continued effort in coal and iron production had to be maintained and as regards coal, one-half of the annual increase in output demanded by the government in the first post-war years was obtained from the region. The proportion of total iron ore production rose steadily from 76% in 1939 to 86% in 1953. The sharply rising demand for consumer goods further stimulated a return to normal activity though in some industries progress was at first hampered by the difficulty of obtaining raw materials.

Of great advantage was the fact that the region suffered comparatively little destruction through enemy action. The number of separate premises destroyed or seriously damaged was under 54,000 compared with 216,000 in the West Midlands and vastly greater numbers elsewhere<sup>(1)</sup>. Even Northern Ireland sustained more damage and only Scotland suffered less.

To conclude, the economic potentiality of the East Midlands, in view of its reserves of basic resources such as coal and iron and its undoubted scope for further industrial expansion, provided the requisite labour can be found, is exceptionally great. In terms of production, both agricultural and industrial, the region has possibilities shared by few others in the country. It was stated earlier in this article that in no sense do the East Midlands constitute a geographical region. The idea of a "regional consciousness" as applied to the area was also dismissed. Yet in so far as the East Midlands is a regional division within which government policy and private interests touching many fields of development are administered for the well-being of the community, the co-ordination of activities in those various fields throughout the region is already advanced. Through organisation, which is an expression of policy, rather than by any inherent qualities of the region, the East Midlands, to repeat Carl Sauer's phrase, may be regarded as a "functionally coherent" unit.

## LOUGHBOROUGH: AN OUTLINE URBAN SURVEY

G. H. WEDLOCK

Loughborough is the third town of Leicestershire with a population of 35,000 (1951), cf. Leicester 285,000 and Hinckley 39,000. It is an old established market town, possessing a corridor situation in the Soar valley, with a river terrace site a little above the flood-plain. The medieval town had grown to a population of about 2,000 by 1564 and had become the chief market settlement of the lower Soar valley. Two corn mills were established on the Soar (both mentioned in the Domesday Survey), and a market was granted in 1564, while in the same century, grants for fairs were obtained. An ancient bridge had been constructed over the Soar at this point, providing an important river crossing on the

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(1) Figures from *War Damage Commission Report*, 1945.

chief routeway of Leicestershire through the Soar valley. As Nottingham Derby and Leicester developed into regional centres, Loughborough became the intermediary point between all three. Above all, the town benefited from the expanding productivity of Leicestershire agriculture, and its market function flourished, generating milling, malting and rough woollen manufacture.

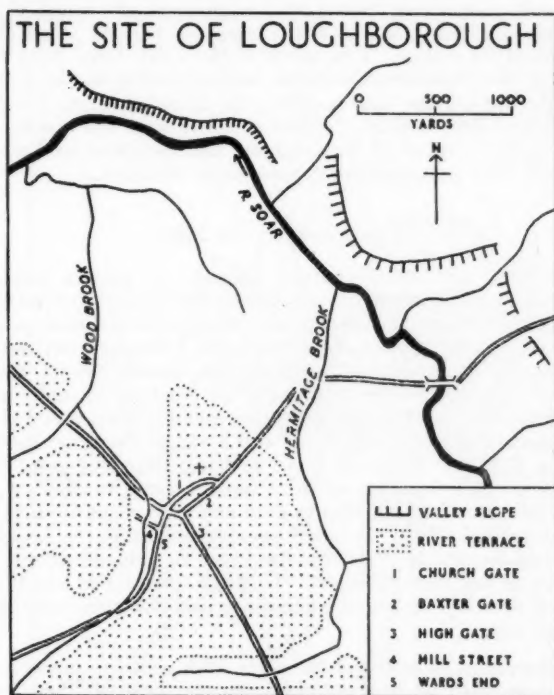


Fig 1

### THE EARLY TOWN

The medieval street system reflected the original site of Loughborough around its church (Fig. 1). Two small tributaries of the Soar, the Wood Brook and the Hermitage Brook, drain from Charnwood north-eastwards to join the main river. At this point the flood-plain is about a mile wide with the river close to the eastern edge. A large river terrace rises above the flood-plain level and the church stands on the edge of the terrace between the two streams. The early settlement was thus confined to the east and north by the flood-plain which was subject to considerable winter inundation. To the south and west it was restricted by the wooded slopes of the Trias Marls (Keuper) in which the valley is cut and the rising ground of Charnwood.

Early Loughborough remained small and developed no well-defined compact form. The chief streets existing in the 16th century were Church Gate and Baxter Gate, which together formed the Nottingham road crossing the flood-plain; the High Gate; Wards End (Woods End),

leading to Charnwood ; and Mill Street, crossing the Wood Brook. Only the Nottingham and Derby-Leicester roads continued as such outside the town. Those of lesser importance soon deteriorated into paths which crossed the surrounding woodland, wasteland and open fields of the Manor.

A market place grew up at the meeting of roads. Aligned along the Wood Brook, it was terminated by a large pool (the origin of its early name, Fishpool Head), and it was frequently flooded when the Wood Brook altered its course. Few parts of the early town were free from flooding by the Charnwood streams, while flooding in the Soar valley periodically cut off the routes using the Loughborough bridge point. Epidemics and fires limited the size of the town. Its market suffered competition from those of Nottingham and Leicester and its milling, malting and wool manufacture subsequently declined.

#### DEVELOPMENT TO 1880

Late 18th and 19th century factors of growth lessened the agricultural basis of town development, and stimulated its rise as a manufacturing centre. Loughborough became established as a link in the coaching traffic from London through Leicester northwards. At Loughborough the main road divided ; the eastern branch went on to cross the Trent at Nottingham, and the western branch, using the Cavendish bridge (constructed 1758) continued to Derby and the north-west. A canal for coal traffic from north of the Trent reached Loughborough in 1779 and the town acted as a transhipment point for goods to Leicester. This function ended when the canal reached the county town in 1786. Further, it failed to gain any advantage from the Charnwood Forest canal (1786), designed to carry coal from the Leicestershire pits to Nanpantan and then by tramway to Loughborough, for the project was an engineering failure. Thus the town failed to add much to its regional nodality during the canal age and the same may be said of the railway age.

The dominant industry of the early 19th century, hosiery, was not however dependent on coal supplies. In the East Midlands' domestic phase, Loughborough acted as a centre of organisation for a wider rural area which in turn was integrated with a still larger region dominated by Nottingham and Leicester with Loughborough merely as a sub-centre. Later, as concentration in factories proved advantageous, it became a focus for the former scattered distributions and, in addition, several firms from the larger centres were set up in the town ; for labour was cheaper and less well organised. Between 1801 and 1831, its population rose from 4,603 to 10,609, a rise which coincided with a period of unprecedented industrial expansion. New products were tried out and the town became noted as a centre of mechanical inventions, though the enterprise of manufacturers contrasted with the depressed state of the frame-work knitters. In the early years of the 19th century lace-making was also represented but, through labour troubles, the industry declined, and then died out. Until the 1830's, the town attracted much outside labour, and in the over-production which followed, depression was severe and unemployment considerable. Unlike the medieval activities, those of the 19th century were no longer based on a limited local area, but were increasingly liable to economic factors outside the town's control.



Loughborough stagnated following the expansion of the early 19th century, having lost many of its former activities (milling, malting and its coaching traffic), and having failed to maintain the new ones introduced. It was precariously dependent on one range of industries very liable to economic fluctuations; consequently population growth was spasmodic and even declined between 1831-1841 and 1851-1861, both periods of industrial depression. During this time only one new industry was introduced, that of bell-founding, for which Loughborough was fortuitously chosen in 1840 as the site for a previously itinerant industry.

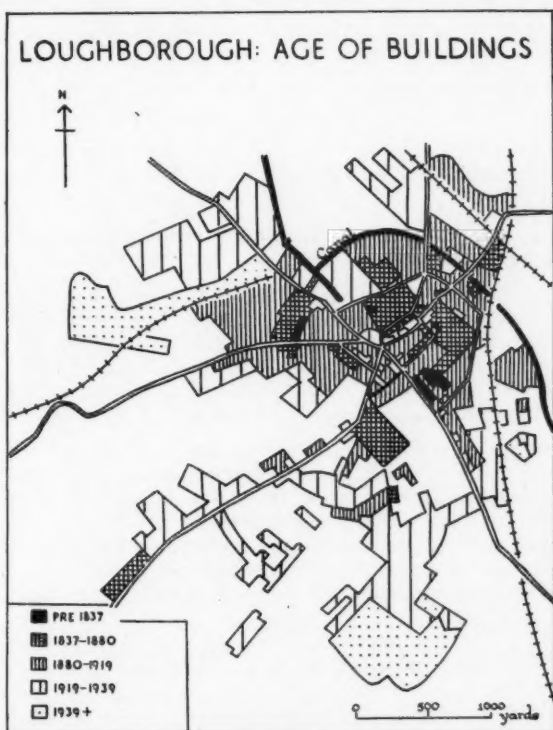


Fig. 2

The extent of the town was slow to increase (Fig. 2). Poor housing, crowded in rows, filled up the once fairly open land of the town centre. Typical development of this time is the Moira estate adjacent to the Leicester road, on land freed for building by the sale of a local estate. The Regent Street area of housing between the Derby and Ashby roads, began the filling in of land between the main roads radiating from the town centre. Certain town improvements were made: the widening and drainage of the Rushes (1810), a place-name which reflects the marshy banks of the Wood Brook which once flowed in an open course through the town; the widening of the market place, together with the clearance from it of the oldest buildings, the Hucksters Row and the Shambles (1810). New building occurred in scattered plots in all parts of the town,

but particularly north-westwards towards the canal terminus and south-eastwards adjacent to the Leicester road. Development to the north and east remained insignificant.

#### INDUSTRIAL EXPANSION AFTER 1880

The second period of renewed industrial expansion took place in the last two decades of the 19th century and was based upon the engineering group of industries which gave a new orientation and impetus to the town's functional growth. The chief advantages of Loughborough for large engineering works were :

1. A labour supply highly dependent on one group of industries, namely hosiery and allied trades :
2. Good rail communications to coal, iron and steel supplies and for the distribution of heavy products north of the Trent and west of Charnwood (by the Charnwood Forest railway, 1881) :
3. Large flood-plain sites available, by now adequately drained and of low rateable value.

Two major firms were sited here, the Brush Company, moving from Lambeth, 1889, to be nearer coal supplies and Herbert Morris, moving from a constricted site in Sheffield, 1906. They adopted sites along railway and canal and expansion of both firms was rapid. Between them they absorbed much of the male labour of the town, so that hosiery switched mainly to female labour in the unskilled branches of the trade.

These two complementary industries, hosiery and engineering, were the basis upon which the modern industrial expansion was laid. A pool of skilled engineering labour was created in addition to the nucleus of skilled hosiery labour built up in over a century's experience of the work. Once this industrial structure had been established other firms followed, attracted mainly by the prospects of a skilled labour supply, local industrial contacts and access to markets.

#### MODERN URBAN PATTERNS

Steady growth of population extended the urban plan (Fig. 2). Working class areas of housing appeared as a fringe to the north and east and most of the land as far as the flood-plain was built over by the end of the century. Twentieth century housing changed this trend. Built at a much lower density, it sprawls south-westwards, the Shelthorpe Estate almost approaching Nanpantan, while another estate has engulfed the previously independent village of Thorpe Acre.

Functional changes and a growing civic consciousness cleared most of the buildings of previous centuries, often leaving small patches of land undeveloped and derelict. In turn a burst of new building began. It coincided with the new forms of communications and the gradual introduction of new building materials and substantially altered the "town-scape". The rural aspect of the medieval town, with individual cottages of wattle and thatch widely spaced among tilled land, was replaced by the truly urban appearance of the 19th century building. The greatest single change resulted from the almost universal use of



brick, produced in nearby brickyards exploiting the Keuper Marl. Similarly, roofing materials changed from thatch to the hand-dressed slates worked five miles away at Swithland and in turn to Welsh slates.

The central area of the town contains sharp transitions with modern street frontages concealing behind them many of the oldest surviving buildings. Its piecemeal arrangement is the result of deliberate slum clearance, functional changes, relative changes in site values and the effects of street widening, each operating on a small scale and not over the central area as a whole. The area of greatest age uniformity lies as a fringe around the central area, the product of the early and middle 19th century expansion and little altered since then. Middle 19th century housing appears in every sector around the centre, the low class housing of the east being balanced by the higher class housing of the south-west. After this date housing becomes increasingly selective in relation to the centre. Residential building of the later 19th century which was predominantly working class, tended to concentrate on the north and east; residential building of the 20th century reversed this trend, forming in the south-west sector the biggest and most uniform of all the divisions in the age structure. Thus the town has grown, both through the adaptation of its central area and through the expansion of its margins.

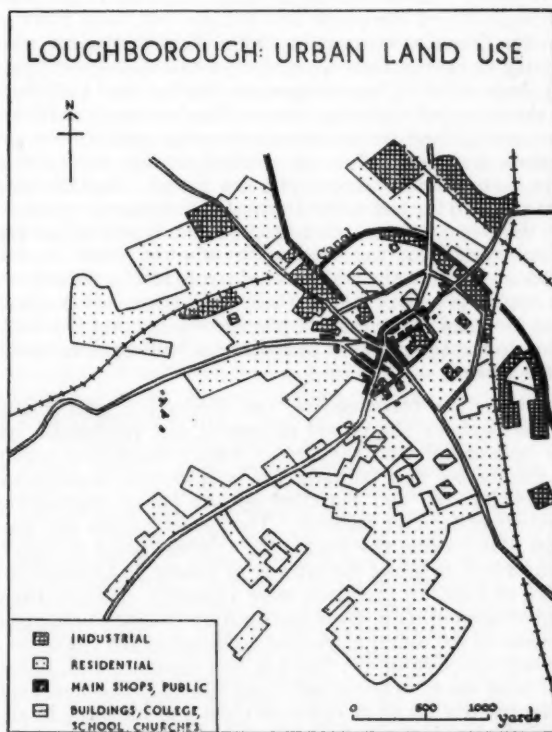


Fig. 3

Land-use in the central area remains very mixed (Fig. 3). Around the head of the market place lie the few large shops in which the commercial function occupies the whole of the building and shops continue along Church Gate, Mill Street and Wards End, mutually attracting each other in a few concentrated thoroughfares.

A partial zone of industrial units lies close to the centre, the premises usually having only a narrow frontage on streets where there is competition for other uses. One example is the large textile engineering works sited in 1887, which now spreads widely between Baxter Gate and Pin-fold Gate. The Gas Works (1836) also have an inconvenient site near the canal which once conveyed their coal supplies but in a narrow side-street having poor road access.

The market place has not altered in size since the early 19th century and traffic movement now conflicts with its market functions. The old narrow outlet south-west to Wards End contrasts with its continuation in the spacious Forest Road, the modern outlet to the south-west. Other old roads illustrate the changing values of streets as thoroughfares. Church Gate, once the most important street between church and market, is now a little used one-way street and the diversion of through traffic has helped to preserve its old character. In contrast, other roads have been adapted to the changing needs of traffic. The widened Baxter Gate has replaced Church Gate as the main entrance to the market place from Nottingham and the north and became relatively more important still when the Coneries was cut in 1930. This eliminated the previous indirect entry to Baxter Gate around the churchyard and Sparrow Hill. Above all, because of its importance as a traffic route and the new sites available through road widening Baxter Gate has attracted the extension of the commercial land-use of the market place, chiefly the new banks, shops, cinema and Post Office, all needing readily accessible sites and creating in themselves a large volume of traffic. But the chief line of movement through the town, the Derby-Leicester road, is less effectively served by the street system. Since there is no bypass all through traffic on this road must cross the head of the market place. Indeed in the central area as a whole the widening of roads has increased less rapidly than the traffic intensity along them and their radial arrangement, focussed at the head of the market place, while serving the needs of local traffic going to the town centre, is at times a hindrance to traffic passing through the town.

Away from the town centre, the Derby-Leicester roads form a dividing line between the mixed industrial and residential land-use of the north-eastern half and the almost wholly residential south-western half. In the former half factories are widespread, interspersed among 19th century housing and bounded by the heavy engineering works, closely tied to canal and railway. The hosiery firms are particularly widespread, sited along the canal, the original point of entry for raw materials and fuel, or along the railway or finally, in all parts of the town where space to build, or premises, were available. Despite the many ill-placed and congested sites, their distribution is slow to change and they comprise some of the oldest industrial buildings in the town. In contrast, the south-western half of the town is less compact and almost wholly residential with many schools and open spaces. The new estates have so far attracted few shops or other services and industry in any form is almost entirely lacking, emphasising the increasing separation between place of work and residence.

### EMPLOYMENT CONDITIONS

At the present time 65% of the total labour force is in manufacturing industry, and engineering accounts for 36.8% of the total, mostly in the two largest firms. 19.5% of the total is employed in the textile group of industries. Against the 19th century background of persistent unemployment, the 20th century record shows marked differences. Even at the height of the 1930 depression unemployment in Loughborough was considerably below that for the country as a whole. The most fluctuating of Leicestershire industries, the boot and shoe industry, is not represented at all. Unlike the rest of the country, female unemployment was the more severe; the hosiery industry tended to keep on its most skilled male workers and female labour which was less able to travel to work in other centres suffered accordingly. Short-time working was prevalent so that under-employment, rather than unemployment, was the chief factor undermining the town's previous prosperity. Further development is to some extent hindered by the lack of sufficient labour of the right type in years when trade is good and a large daily movement of workers is focussed on the town. This reflects the more rapid expansion of industry over the available labour supply and indeed Loughborough's sub-regional function is rather as a focus for employment than as a centre for general urban services.

### CONCLUSION

In short, though the underlying physical factors of site played a significant part in the initiation and early development of the settlement, in themselves they have proved inadequate in the modern period to make Loughborough as important a town as Leicester, Derby or Nottingham. Developing from the early market centre with agricultural processing industries, the town assumed wider regional contacts, making possible the changed relation of the town to the sources of raw materials, markets and later to labour supply. Expanding in size, new growth was controlled by the limiting factors of site especially the bounding limit of the flood-plain, and each addition to the original nucleus used distinctive building materials and styles, culminating in the modern varied "town-scape". Growth has become manifest in other ways, through the town's capacity to support a fuller range of functions. From the early 19th century group of industries, narrow in range and over-dependent on the hosiery industry, the modern well-balanced industrial structure was developed with two basic industries, hosiery and engineering, and a few smaller industries of more recent origin: chemicals, coach-building and elastic-web making. The post-railway industries were attracted by cheap land and rates, spare labour, good communications and available coal and electricity, but their location at Loughborough in particular seems otherwise quite fortuitous. Development has not reached the point where industrial growth gives rise to the administrative and other functions which come with increasing size and status, though the rise of the town as an educational centre of special importance to engineering has widened its functional interests. The College of Technology which draws its students from all parts of the world is a prominent feature of the town. Loughborough's regional attractions lie mainly as a centre of work. As a centre for the provision of urban services, Loughborough has to compete with the three neighbouring county towns and apart from the normal shopping provisions and the services of administration usually associated with a town of Loughborough's size, the regional attractions of Nottingham, Derby and Leicester are very much greater.



Fig. 1  
 Output of deep-mined coal, 1952.

## THREE MAPS ON COAL PRODUCTION

E. M. RAWSTRON

While the general importance of the East Midlands coalfields is commonly understood, certain comparative details of their prominence are perhaps less well known.

Three maps are published here illustrating aspects of the geography of coal production in Great Britain. All are based on data for Coal Board Areas (not Divisions) in Tables 1 to 8 (pp. 223 to 241) in the Report and Accounts of the National Coal Board for 1952. Figure 1 shows output, Figure 2 manshifts (total employed) per 1,000 tons and Figure 3 shows profit and loss in absolute terms. The symbols on each map are approximately proportional in area to the quantities represented.

Interesting comparisons can be made between the three maps. For example, the Forest of Dean has a very small output (Figure 1), a large number of manshifts per 1,000 tons (Figure 2) and a high loss (Figure 3). At the opposite extreme the Leicestershire and South Derbyshire coalfield has a high output, the smallest number of manshifts (490) per 1,000 tons and a large profit.

The salient feature on Figure 1 is the comparative importance of the Yorkshire, Derbyshire and Nottinghamshire field. Today it is relatively more important in output than formerly but the East Midlands section has been responsible for the greater part of the increase. It is perhaps unfortunate that the bulk of the past and future increase in this section of the field must consist of general purpose coal lacking in caking or special coking properties.

Production in the field as a whole requires a considerably smaller number of manshifts per 1,000 tons than most other coalmining areas (Figure 2), but it should be noted that in this respect too the East Midlands section is better placed than the rest of the field. All areas except one in the East Midlands Division (N.C.B.) needed fewer than 600 manshifts per 1,000 tons in 1952, while in the North Eastern Division (Yorkshire mainly) more than 700 manshifts was the rule. Further, although both Divisions are dominant on the map of profit and loss (Figure 3) the East Midlands shows the greatest profit both absolutely and in proportion to output.

It must be stressed, however, that the map of profit and loss is less satisfactory from the geographer's viewpoint than the other two maps; for while costs certainly bore a close relationship to conditions of economic geography applicable to the industry in 1952, prices were not similarly freely determined. They were governed by the National Coal Board's pricing policy which is concerned rather with accountancy on a national scale than with the circumstances of regional geography. The general pattern on Figure 3 may therefore be subject to considerable changes over relatively short periods and should be used cautiously in attempting to draw conclusions.

Notwithstanding this reservation the important rôle of the East Midlands in coal production today is clearly indicated in these illustrations. Actually a recent statement issued from the Coal Board shows that the East Midlands Division has now become the most productive in the country, the output, 21·31% of the national total, slightly exceeding that of Yorkshire which is 21·20%, during the first quarter of 1954.

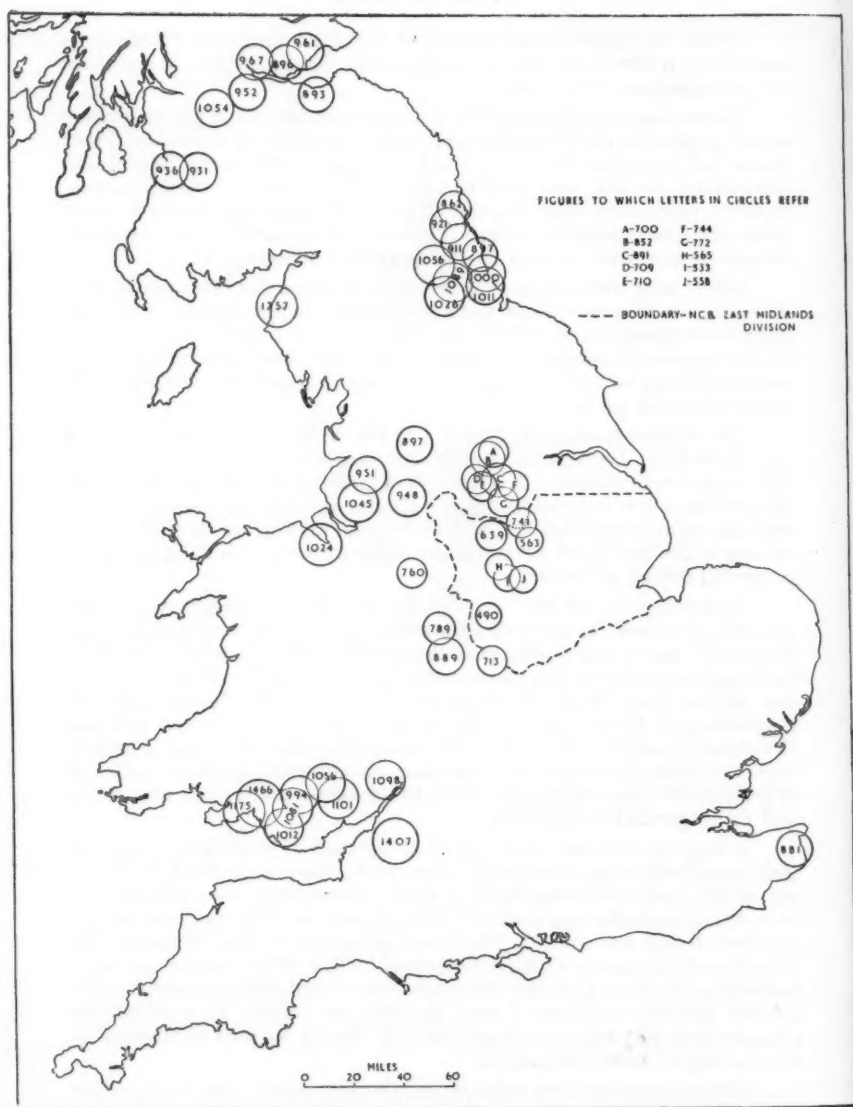


Fig. 2

Man-shifts per 1,000 tons in N.C.B. Areas (deep-mined coal only) 1953.

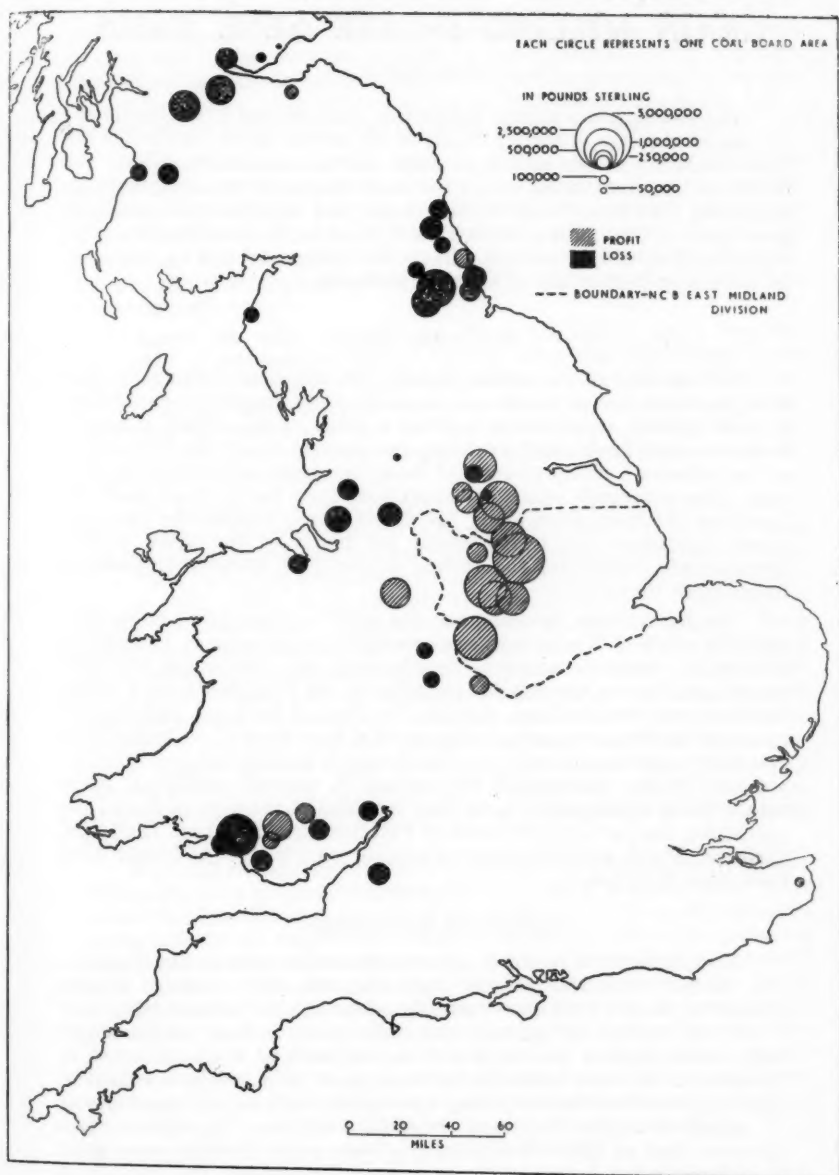


Fig. 3

Profit and loss in coal production by N.C.B. areas 1952.



# GEOGRAPHICAL CONDITIONS AFFECTING GRAIN MILLING IN THE NENE BASIN

JOHN SMITH

The British grain milling industry is concentrated in the hands of a few major concerns operating chiefly in the largest ports. In each of the three branches of the industry—flour milling, provender milling and breakfast cereal manufacture—a few large firms and establishments are dominant. The Nene Basin which is the subject of this study contains no great port and its milling industry is typical of the corn-growing areas of eastern England, where the industry still plays, as it has for centuries, an important part in the agricultural economy.

## THE NENE BASIN

The survival of the milling industry in the Nene Basin illustrates how general economic trends can be modified by geographic conditions. A river basin is a convenient unit for a study of the milling industry, because a river could until a century ago provide two of the basic needs of the industry: cheap power and cheap transport for bulky commodities. The watermills which produced flour from Saxon times until the Victorian era were sited along the rivers which formed the principal inland routeways for heavy goods for much of the same period. Traditionally, therefore, the milling industry of eastern England is linked with its rivers.

The River Nene, draining an area of 920 square miles, flows from the hills south of Rugby north-eastwards for a distance of 75 miles to The Wash. From its source to Peterborough the river drains a normal river basin, but in the 273 square miles of the Catchment Area below Peterborough the drainage through the Fens is artificial, and the old course of the Nene runs some miles south of the present Catchment Area boundary. As this boundary in the Fenlands is irregular and takes no account of the distribution of population, several additional areas totalling 150 square miles have been included in the area of study. In particular, the parts of the towns of Peterborough, Spalding, Holbeach, Wisbech, March and Whittlesey which lie outside the Catchment Area have been included.

## HISTORICAL DEVELOPMENT

Watermills were probably introduced into the area by the Romans, and several references suggest that the 150 mills recorded in the Domesday Survey (1086) were already centuries old. Some of these may have been worked by animals, not water-power. Many of the water mills which remain are no doubt on the sites of those recorded in Domesday. In some instances the re-siting of mills has been recorded, and it appears that the early ones were lightly built structures requiring no extensive engineering work for their erection. It seems certain however, that all the mill sites on the Nene below Northampton must have been in use before 1352, when an Act restricted the erection of weirs on navigable rivers. Most of the mills in the main valley of the Nene were sited on the edge of the flood-plain, where firm ground was available: the mills probably determined in some places the course of the river across its flood-plain.



Corn mills played an important part in feudal economy. The lord of the manor held a monopoly of milling, and the use of querns, which would have enabled each household to grind its own corn, was forbidden in England. The number of mills in use remained fairly constant throughout the Middle Ages, owing to the difficulty of creating or destroying milling rights. The miller was not an independent merchant, but a servant of the lord of the manor, taking toll for services rendered.

In areas where water was deficient, the animal-powered mills were largely replaced by windmills, which were introduced in the twelfth century. In 1323 the building of windmills was included among the reasons for the destruction of the woodlands of Pipewell Abbey, near Kettering. The windmills of that period were made entirely of wood, being of the 'post' type, so called because the whole structure pivoted on a central post.

Though the mills of the Nene Basin gradually passed into the ownership of independent millers, chiefly after the dissolution of the monasteries, the feudal rights remained with the mills until the Enclosure Movement and the growth of towns caused the system to break down. Kettering had grown too large to be supplied by its mill by 1653, but Daventry remained tied to the horse-driven mill and bakehouse on the High Street until after 1820.

The Enclosures brought about a change in the milling industry. Hitherto grain had been brought to be ground in small amounts, perhaps only a sack at a time, and the scale of operations had been restricted to local trade. After the Enclosures the millers began to trade more widely, buying corn, selling flour, and often baking bread also. Gristing, or milling on commission, remained as a relic of the old system. More storage space was needed, and the introduction of ironwork and gearing of greater strength made it possible to install more powerful waterwheels to drive two or more pairs of millstones. Watermills, which had hitherto been single storey buildings with external water-wheels were rebuilt with enclosed wheels and three or four storeys, the ground floor containing the millstones and the upper floors the grain bins. Thus Cotterstock Mill was rebuilt in 1803, Upton in 1815, Englethorpe in 1835 and so on, until hardly a representative of the old style remained in all the Nene valley.

A similar change took place in the construction of windmills. Tower windmills, having machinery mounted in a brick or stone tower, were introduced from Holland into the Fens as drainage mills in the sixteenth century but in the eighteenth century were built as corn mills, replacing the old wooden post mills as the occasion arose. This frequently happened since the latter, being comparatively frail structures, were liable to be burnt or blown down in a gale. The rapid improvement in the technique of windmill construction can be seen in the Fenlands, where the tiny three-storey tower of Lutton Gowts mill, built in 1776, may be compared with the eight or ten storey giants built nearby at Gedney, Holbeach and Long Sutton fifty years later. A few drainage mills, when replaced by steam engines after 1820, were converted into corn mills; as at Murrow, Tydd St. Giles and Spalding (Lock's Mill).

The building of the Grand Junction Canal, completed in 1805, heralded the industrial revolution for the Nene valley mills. River traffic above Thrapston was revived as a result of the construction of the branch canal to Northampton, and the mills along the Nene found a new outlet for their flour in the growing Midland industrial towns. Spalding

and Wisbech became important centres of the grain trade as the Fens produced more corn and boats navigated the drainage channels, and some of this grain was milled locally for shipment as flour.

In the course of the fifty years following the construction of the London to Birmingham railway in 1838 a network of lines covered the Nene Basin, so that very few places were more than five miles from a railway. More use was made of imported grains: by 1850 Russian, Italian and Persian wheats, Persian barley and American maize were being treated. Mills in valleys followed by the railways thus had advantages over those, such as the Nene valley above Weedon and the Willow Brook valley, which were not served.

The coming of the railways coincided with the emancipation of the mills from the restrictions imposed by wind and water-power. Earlier steam engines had consumed too much fuel to compete with natural power in this industry but in 1845 McNaught's high and low pressure beam engine was introduced and within a few years steam-driven mills were being erected to produce flour in large quantities for distant markets now made accessible by the railways.

One of the largest flour mills now operating in the Nene Basin, that at Peterborough, owes its origin to the combination of circumstances outlined above. The railway from Blisworth along the Nene valley reached Peterborough in 1845, and the mill was built in 1848 between the railway terminus and the river, then an important waterway for coal and grain traffic. Situated close to an important market town and route centre, the mill thus had the advantage of both a railway siding and a river wharf. The output of this new steam mill far exceeded the needs of the locality, and a trade with Birmingham and other Midland towns soon developed. At Spalding, Wisbech and March other steam mills came into operation to supply distant markets, using both rail and coastwise water transport to dispose of their products.

#### GRAIN MILLS IN 1870

The location of grain mills working in 1870, showing whether the motive power was wind, water or steam or a combination of these is shown in Fig. 1. The larger mills are distinguished by the fact that they were equipped with steam power. Almost all the 219 mills shown on this map produced flour for human consumption and in addition (using stones of millstone grit instead of the French 'burr' used for flour) ground coarse grains for use as animal feeding stuffs. Gristing remained an important part of the trade of rural mills. Up to the end of the nineteenth century each labourer brought his sack of grain grown on his allotment or gleaned from the fields for grinding at the small local mill. This accounts for the scatter of wind and water-mills shown on the map. In the Fens the windmills were concentrated, like the population, along the Town Lands of the silt belt, few remaining in the peat belt where dozens of drainage windmills had been at work fifty years earlier. The watermills were concentrated where the greatest power was available, along the Nene below Northampton and on the lower courses of the chief tributaries. Of the 35 potential mill sites below Northampton (where the river is ponded throughout by mill weirs and navigation locks) only five were not used for grain milling in 1870, and of these five sites two were used by paper mills. The mills on the main rivers were worked by low breast wheels and had mill-ponds below the mill to avoid the tail-water flooding back to choke the wheel: this was liable to occur when the mill down-

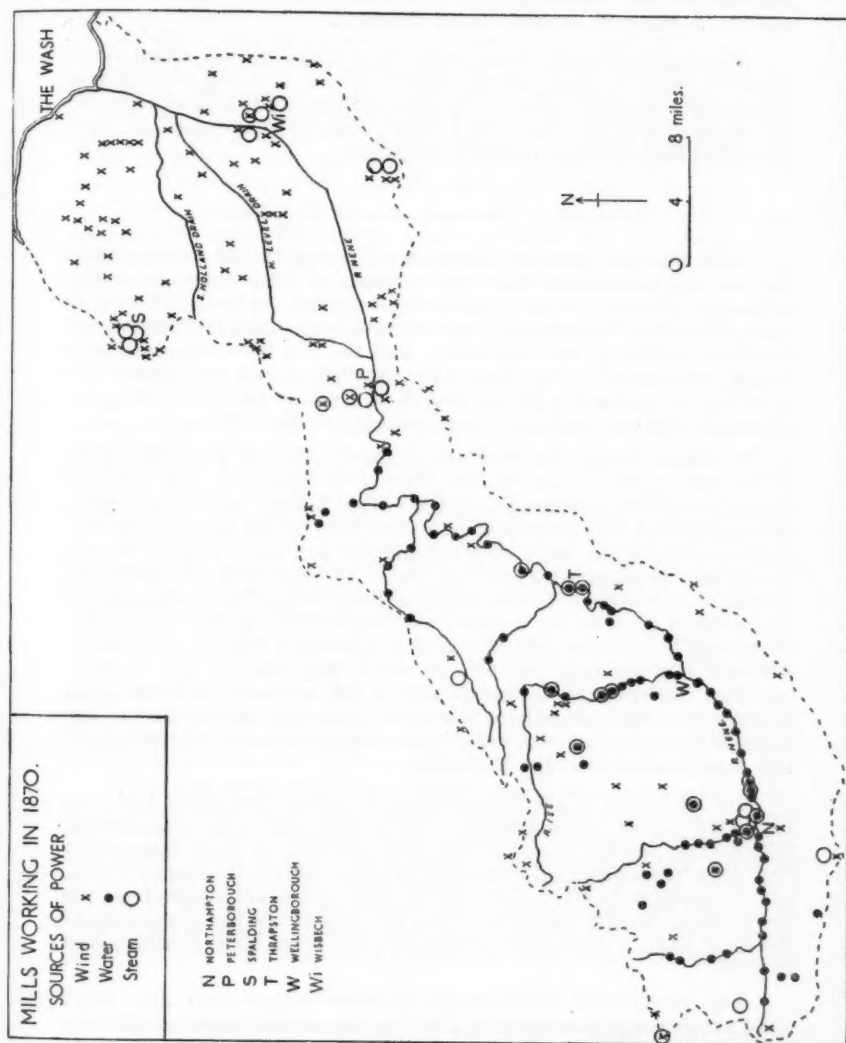


Fig 1—Nene Basin Mills in 1870.

stream was not working. In summer when water was short the mills would work in turn as a spate of water passed downstream. Away from the main rivers, some watermills worked on tiny streams, ponding up the water above the mill all night to allow a few hours work, as can still be seen at Harlestone, Moulton and Sacrewell Mills. A number of windmills served the higher parts of Northamptonshire, where access to watermills was poor or water itself deficient.

There were 32 steam mills or mills fitted with auxiliary steam power in 1870. Half of these were in market towns, and the proximity of population was clearly a major influence in their location. Northampton, the largest town, had four steam mills within its boundaries and there were five others within a radius of five miles.

#### CHANGES IN TECHNIQUE AND TRANSPORT

After the new economy based on rail transport and steam engines had become established there was a series of innovations in milling technique, constant expenditure being necessary to keep mills up to date. Thus the differences between mills well-sited and prosperous, and therefore justifying new machinery, and the less favoured mills, were quickly emphasised. The chief of the innovations was the substitution of rollers for millstones as the means of grinding the flour, but great advances were also made in wheat cleaning and flour sifting.

Foremost among the Northamptonshire millers in the introduction of the new technique was Joseph Westley of Blisworth. His business began with a windmill supplying the village bakery, and about 1850 a steam mill with two pairs of stones was added to the bakery. In 1864 he leased the Nunn Mills at Northampton and later bought Weston Favell Mill, to sustain his growing trade. In both these old watermills he fitted steam engines, for the mills could receive both coal and imported wheat direct from barges on the river. In 1879 the steam mill at Blisworth was burnt down, and almost simultaneously Westley received an offer for the windmill, the site of which was wanted for ironstone working. He took the chance to build a mill equipped with the latest machinery on the canalside at Blisworth, preferring canal to rail access. Nunn Mills was fitted with roller plant soon afterwards, and Westley's mill sent flour all over the Midlands.

By 1887 most of the larger flour mills of the Nene Basin had been converted to the roller system. When new machinery was needed, millers often decided to seek better sites, especially in those cases where they were tenants and not owners of the mills. Mills in the market towns, where transport facilities were usually good, attracted millers from the surrounding country districts. Thus the trade from five watermills in the Long Buckby area was transferred to the Town Mills, Northampton in 1900.

The importance of transport facilities rather than any other consideration was illustrated in 1886 by the establishment of Victoria Mills, Wellingborough, the largest flour mill now working in the area. In this case the business was moved from the old watermill at Turvey on the River Ouse to a site at Little Irchester, where road, water and rail transport facilities were excellent, and close to the important corn market of Wellingborough and the rapidly growing towns of mid-Northamptonshire.

After 1900 the use of motor lorries began to cause a further decline in the trade of mills which could not afford this method of transport. Horses could deliver up to 15 miles economically, but lorries greatly increased this radius and competition from both local and port millers grew rapidly. Had it not been for road transport, the small mills might have kept their trade, for small internal combustion engines and tiny roller flour plants (such as the Tattersall 'Midget' made at Towcester) enabled them to produce good quality flour in restricted space.

During the 1914-18 war the national output of flour increased and afterwards the capacity of the mills greatly exceeded demand. Many mills in the Nene Basin, as in other parts of the country, were closed. These included some of the largest, such as Westley's Blisworth mill, which became a warehouse, and the Burton Latimer mill, which was converted into a factory for the manufacture of a breakfast cereal.

Provender milling was also depressed in the 1920's due to the agricultural slump. The position improved about 1930, and the development of modern feeding-stuffs brought about a distinction between the larger provender mills, equipped to produce balanced rations, and the smaller mills which milled only straight-run meals, but generally purchased balanced rations or various ingredients for mixing and merchenting.

The change which road transport has made in the siting of industry is well illustrated by the expansion of Bugbrooke Mills, which have been developed greatly during the past twenty years. This ancient watermill, owned and operated by the same family since 1476, had continued to produce flour and provender during the period of intense competition. Situated, like many other water mills, in an isolated position, five miles from a railway station and two miles from a canal wharf, the mill could not economically have been enlarged earlier on its old site. Road transport and electric power made its development possible during the 1930's, and it now comprises a large flour mill with silos for 3,200 tons and a provender mill where balanced rations of all types can be produced. As at many smaller mills, the farming interests of the firm have been retained, the farm buildings adjoining the mill serving some 1,300 acres.

Since 1939 the flour and provender mills alike have been busy due to the increased demand for their products and the bombing of many of the large port mills. The number at work in the Nene Basin has continued to decline however, due to the closing of many of the small units.

Wind and water mills have largely become uneconomic due to the spread of internal combustion engines and electricity as sources of power. By 1945 only three windmills were working in the Nene Basin, and the last two of these, at Eye and Walpole Highway, both ceased work in 1947. River improvement works have necessitated the closure of a number of watermills, while others have suffered through the loss of their staple trade of gristing, resulting from the purchase by many farmers of high speed grinding plants worked by electricity or tractor.

#### GRAIN MILLS IN 1950

Figure 2 shows the motive power used in the 59 mills which remained at work in 1950. Whereas in 1870 85 mills used water power, only ten small mills now rely entirely on it, and six others, rather more active, still use it as an auxiliary source to some other form of power. All the Nene mills using only water-power are run by millers who are also farmers, and in most cases farming is the dominant interest. Provender milling, which has a peak of activity from October to February when

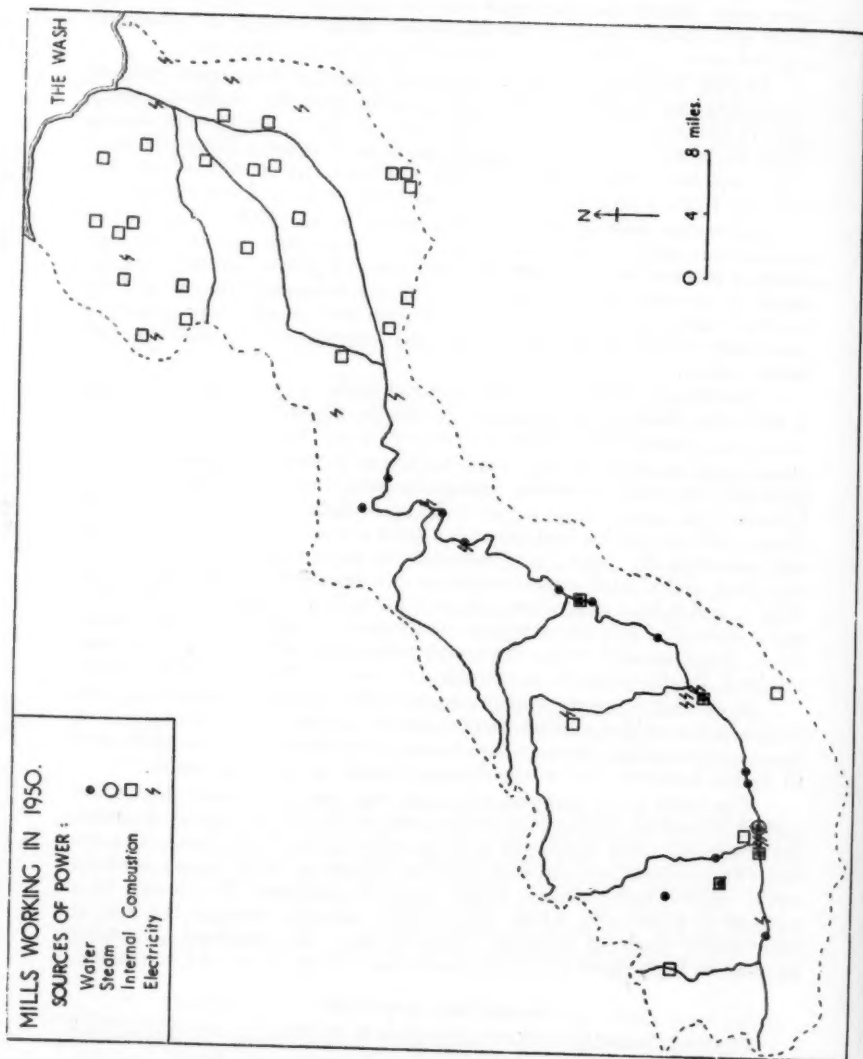
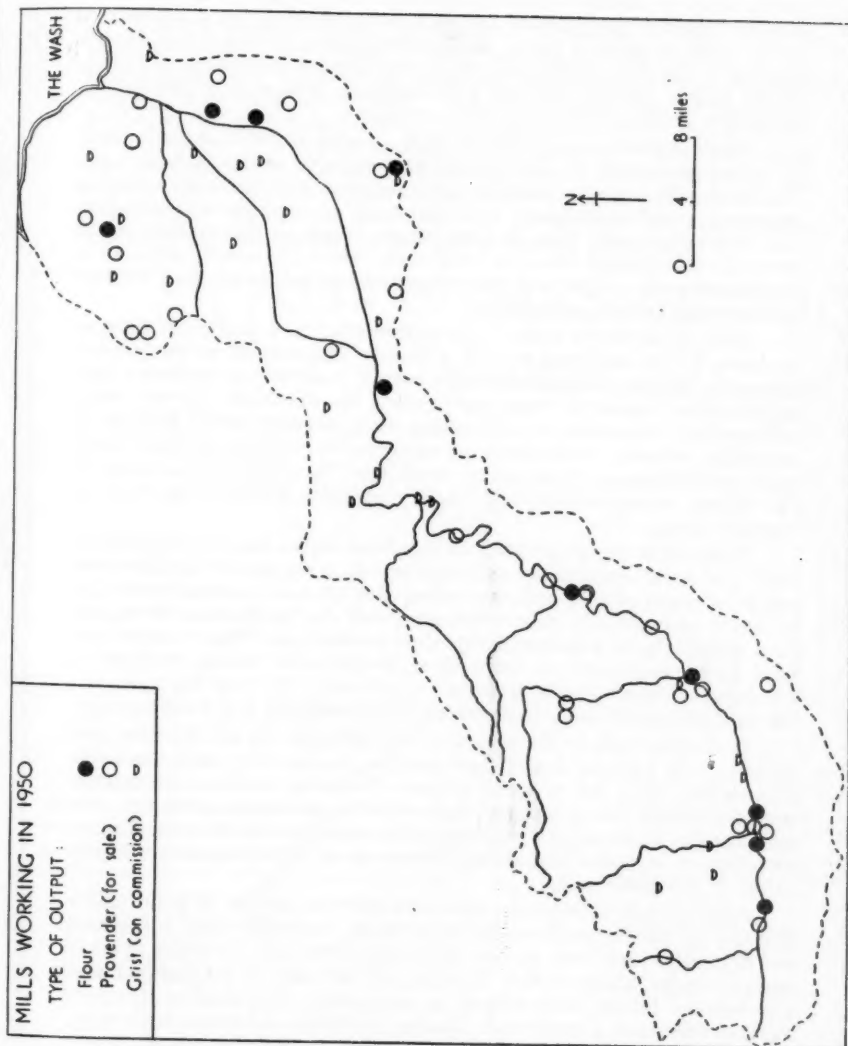


Fig. 2

MILLS WORKING IN 1950

Fig. 2





water power and grain are plentiful and stock are being fattened, fits in well with farming, in which activity is greatest in the summer.

Steam power has been almost entirely replaced by internal combustion engines and electricity during the past fifty years and electricity in particular is rapidly replacing all other forms of power. As far as can be ascertained it was not used before 1930 in this area, but it is now used in 18 of the 59 mills at work. Mills were pioneers in the use of electric lighting in the area, generating their own supplies before the arrival of public mains, and in two old watermills, at Ashton and Bugbrooke, electricity is still generated by water turbines.

Figure 3 shows that of the 59 mills at work in 1950 10 made flour, 26 milled provender for sale and 23 were engaged solely on grist work. The flour mills usually undertake provender-milling which is of varying importance and commission work (gristing) as an important side-line. The provender mills vary in importance, those in the market towns generally being larger than the rural mills, which are usually engaged in merchandising the products of some larger mill as well as grinding on their own account and on commission.

Each of the larger mills tends to specialise on a particular form of business, but is equipped to mill a variety of products as the market demands. All the flour mills produce bakers' flour, which requires a high proportion of imported wheat, particularly the Manitoba variety. Most also produce household or self-raising flour, needing softer English or Australian wheats; these flours are marketed in branded packets. Three mills produce biscuit flour, which must meet the strict requirements of the biscuit manufacturers and usually contains a high proportion of English wheat.

Flour mills remain at work in the Nene Basin despite competition from port mills owing to the existence of a local supply of English wheat and local needs of flour and provender. Biscuit and household flour can be made economically within the area, but the production of bakers' flour depends upon well-established local connections. These connections tend to be weakened, if not broken, because the baking industry is becoming concentrated in larger units, of which the best examples are the co-operative bakeries in Northampton, Kettering and Peterborough.

Provender mills in the area use road transport for all deliveries and for obtaining a proportion of their supplies, and so have been less liable to seek sites with rail or water access. Provender mills are commonly sited in market towns because they work in association with the corn merchandising business, and must maintain contacts with farmers. Today, such factors as power and skilled labour are of little importance in the siting of provender mills.

Grist milling depends on the existence of a supply of grain and a demand for feeding stuffs on the same farm. Since the trade is seasonal and fluctuates from year to year according to the relative prices of grain and provender, a large outlay on plant and buildings is not justified, and a permanent labour force cannot be employed. Grist milling therefore tends to remain on a small scale, sharing buildings and labour with other industries. Water-mills, particularly those in isolated places where transport costs lessen competition, can still carry on a gristing trade, but it seems inevitable that this trade will die out with the present generation of millers. As more farm mills come into use with the spread of electricity supplies, the few remaining water mills will lose the last of their trade. The water-mill is doomed to follow the windmill into extinction in response to the modern need for greater speed and efficiency.



# THE MARKET GARDEN INDUSTRY OF THE MELBOURNE DISTRICT

PETRA LEAY

The countryside within the parish of Melbourne, a small town in south Derbyshire, has a cultivation pattern which ends abruptly at the parish boundary. Beyond the boundary is the typical mixed farming country of lowland Derbyshire; within the parish market gardening predominates, giving rise to strip cultivation and an open, almost hedgeless landscape. It is largely the unexpectedness of the change that raises the question of why, in a very restricted area far from the market garden lands of Lincolnshire and East Anglia, there should be such an extensive development of this form of cultivation. No less than 50% of the total 3,500 acres of the parish are devoted to market gardening.

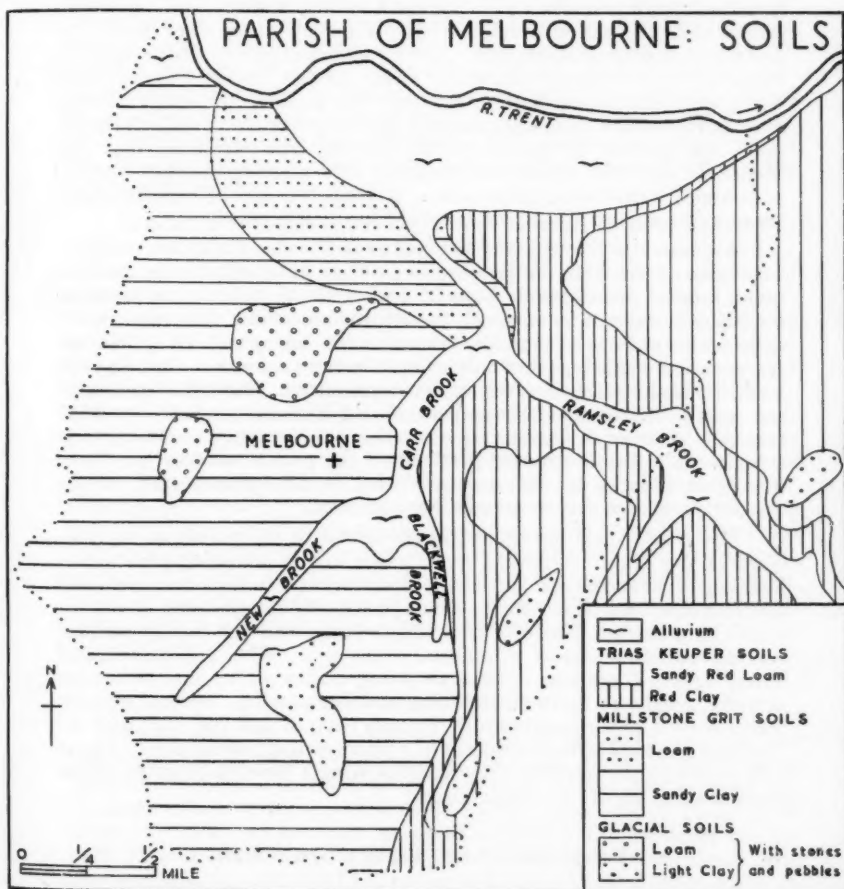


Fig. 1

Melbourne lies to the south of the River Trent, some ten miles south-south-east of Derby, the river serving as the northern boundary to the parish (see Fig. 1). From the Trent floodplain, which lies at about 125 feet above sea level, the surface rises steadily to more than 300 feet near the southern border, but is broken by the valleys of several streams, the New Brook and Blackwell Brook which unite to form the Carr Brook just east of Melbourne, and the Ramsley Brook which receives the Carr Brook shortly before it reaches the Trent floodplain. The area is one of comparatively low relief and the three main valleys, particularly the Ramsley Brook valley in the east, are broad and open. The western and central parts of the parish are formed of Millstone Grit which consists of a rather coarse gritstone containing in the south-west a few thin bands of shale. This formation weathers to a light sandy soil often loaded with quartz pebbles. The eastern part is composed of Keuper Sandstone and Marl which yield a reddish loam with varying proportions of sand and clay. Occasional bands of sandstone in the marls, known as 'skerries', produce slight features on the smooth rolling surface and provide a lighter soil. The valleys are floored with alluvium giving a heavier clayey soil which is often waterlogged. A few patches of glacial drift remain as relics of a once widespread cover. These patches consist either of sand and gravel (containing both quartz and flint pebbles) or pebbly boulder clay, both of which, broadly speaking, have improved local soil conditions. Although specific differences occur between the Millstone Grit and Keuper soils, both types provide good, free working, readily-warmed soils highly suitable for cultivation. Beyond the parish boundary both these soils support a prosperous mixed farming economy.

Climatic conditions are typical of the Midlands. The mean temperature ranges from 39°F. in January to 61°F. in July and August and the mean annual precipitation from 25 inches to 27 inches with no great variation in amount from month to month. In summer rain falls heavily at times in the form of thunder showers, while during the rest of the year it comes more gently, often only as drizzle or heavy mist. Certain local conditions offer relative advantages to agriculture. The higher ground to the south, including the wooded hills of Ticknall and Derby Hills reaching to over 500 feet, affords some shelter from south-westerly storms, while the northward gradient of the parish towards the Trent floodplain induces air drainage resulting in the greater part of the district being less subject to cold fog and frost.

Melbourne itself lies almost in the centre of the parish on an eastward facing slope. Although not a town in the administrative sense, Melbourne nevertheless possesses characteristic urban features and assumes functions which on the whole justify the designation. It was for centuries a market centre of some importance, but the regular market was discontinued almost a hundred years ago. With a population of about 3,000, it remains a local shopping centre with some industrial activity, chiefly in footwear, clothing and engineering. Several historic features such as the magnificent Norman Church and the Hall with its Pool and grounds attract numbers of visitors during the summer. About half a mile to the north is the village of King's Newton towards which the town has spread in recent years.

#### DEVELOPMENT OF MARKET GARDENING

There is a long tradition of market garden cultivation around Melbourne dating back at least as far as the main enclosure period.

The earlier enclosures of the Tudor period, which swept away more than 200 villages in the East Midlands, had little effect upon Melbourne. The greater part of the parish was enclosed by private Acts of Parliament in 1787, although the Park was not enclosed until 1800. Before this however, some land had been set aside as allotments for the use of the poor; about twenty acres along the road leading south from the town were rented from the Hall estate and divided among the most needy families as part of a plan to improve their living standards. Among various stipulations, the tenant was required to cultivate his plot with nothing more than a spade and was forbidden to work on Sundays.

The exact date of the beginning of market gardening in its present form is obscure. J. Farey mentions its existence in Melbourne in 1806 but makes no reference to it on his map of south Derbyshire drawn in 1813, although particulars of vegetable growing in adjoining parishes are given. It is fairly certain that it began in the early nineteenth century for, while Farey may have been referring to the poor peoples' allotments, by 1850 one inhabitant, Samuel Robinson, had 50 employees all engaged in "field gardening" and it seems unlikely that he could have built up this concern in less than a decade or two. If Robinson was not the first to enter market gardening he was at least the inspiration behind its growth over the past hundred years. There is no evidence of a direct connection between the early allotments and market gardening but it is possible that success of those allotments gave the first suggestion of the profitability of vegetable growing.

Soon after 1850 about 200 acres were recorded as being devoted to market gardening. The bulk of the produce, chiefly broccoli, potatoes, onions, and rhubarb was sent to Derby, and smaller quantities to industrial centres in Staffordshire. During the period of railway expansion, especially in the 'sixties, Melbourne became a centre for growing quicksets to fence the tracks; the Melbourne growers themselves travelled all over the country to plant the hedges. Much farmland was used for whitethorn nurseries and when the demand for these quicksets declined many of the growers turned to market gardening and fruit production. During the middle of the nineteenth century transport facilities were rapidly improving and markets in the nearby industrial towns became accessible to the Melbourne fruit and vegetable growers, whereas previously the market area of such perishable foodstuffs had been very local. At that time a relatively large area of apples, pears and soft fruit was cultivated but it was for strawberries that the district became widely known. The industry survived the agricultural depression towards the end of the century and subsequently gathered enough strength for a large expansion which has continued at a varying rate up to the present time.

#### RECENT CHANGES

While there are few available records of the Melbourne market gardening before 1930, the Report of the Land Utilization Survey of 1932-33 provides a useful account. In 1933 market garden land was virtually confined to the Melbourne parish and covered about 1,000 acres. By 1953 the area had increased to well over 1,600 acres and the activity had spread eastwards along the valley of Ramsley Brook into the neighbouring parishes of Breedon and Castle Donington (see Fig. 2). West of Melbourne parish three fields in the parish of Stanton, shown in the 1953 map as market garden land, were in fact owned by farmers who

raised cabbages by farming methods. Indeed during prosperous times vegetables are often sown in one or two fields by local farmers, but this practice does not warrant their being classed as market gardeners. Another field situated just outside the parish boundary on the north is market garden land but in fact it belongs to a Melbourne grower whose family has owned and cultivated it for over 70 years. A single field of



Fig 2.

about eight acres in the parish of Derby Hills is also devoted to genuine market gardening. Generally speaking however Derby Hills and Ticknall are less suited to intensive cultivation, the soils derived from the Carboniferous limestones and limestone shales are poor and much of the land is heavily wooded. Apart from these few instances there is still no westward extension of the activity and the parish boundary sets an abrupt limit to this form of cultivation. This present restriction to the parish may still be a reflection of early conditions when Melbourne was

an area of comparatively small farms, and a handful of local people embarked on the speculative venture of market gardening for which no enthusiasm was to be found in the larger estates of neighbouring parishes.

During the past twenty years there has been considerable change in the size of holding and type of produce. Because of high taxation a number of estates in the parish have been broken up or reduced in acreage and much of this land has been bought by market gardeners. This has resulted in an increase in the size of existing holdings rather than in the number of new gardeners, but there has been an increase in the use of hired labour. The number of small holders remains at about 80, and their holdings range generally from 8 to 50 acres, whereas in 1933 they were

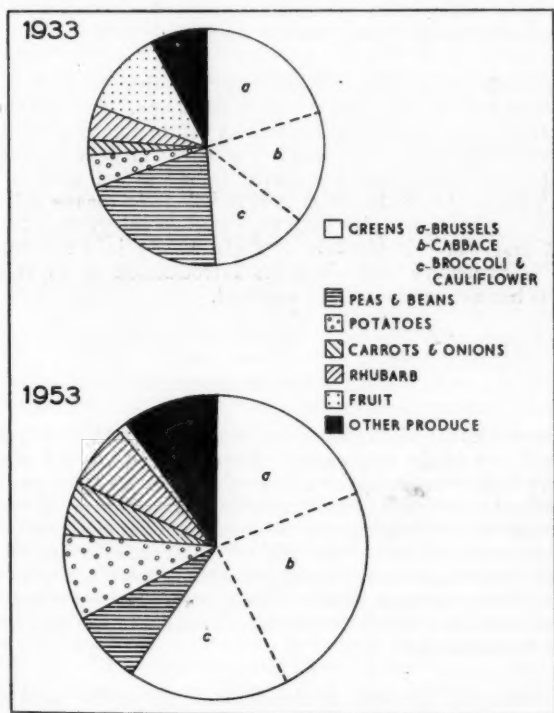


Fig. 3  
Comparative production 1933 and 1953.

between 5 and 30 acres. During the past twenty years the proportion of market garden land owned by the operative has risen from under 30% to 44%. The land is usually handed down from father to son and many gardeners can trace a family connection in working their plot for over 50 years; even rented holdings usually remain in the same family.

As to production (see Fig. 3) the most significant change lies in the substantial reduction in both orchard and soft fruit. In 1933 more than 12% of the total area was under fruit, half of which was in orchards

(chiefly apple and pear), while the rest was planted with strawberries (76% of the soft fruit acreage), gooseberries, black currants, raspberries and a small quantity of red and white currants. To-day, although hardly any of the orchards have been cut down, they are no longer considered profitable and if the fruit is picked at all, it is sold locally. Strawberries are the only important survival of the small fruit.

The decline in fruit production has been offset by a considerable increase in the output of greens, especially spring cabbages and savoys, which now occupy 59% of the total area compared with 47% in 1933. The proportion of land under potatoes has risen from  $4\frac{1}{2}$  to 9%, that under rhubarb from 5 to 7% and that under carrots and onions from  $2\frac{1}{2}$  to 6%. The proportion under peas and beans has been reduced from 21 to 8%. Among other crops grown in significant quantities are celery, lettuce, tomatoes (under glass), parsley and mushrooms.

In the whole parish glasshouses occupy less than an acre of ground and more than half the growers do not possess one. The few that exist are used either for forcing young vegetables before planting out in spring or for growing tomatoes. To assist the early growth of less hardy varieties such as lettuces, radishes, spring onions, as well as strawberries, one or two owners of large holdings have developed a means of irrigating a small plot; a gravity fed pipe with taps at close intervals is led from a small tank and water is allowed to drain slowly into the soil. The apparatus is expensive and since its introduction is so recent, its effectiveness has not yet been fully assessed.

#### CONDITIONS OF PRODUCTION

The vegetables are planted in strips the size of which largely depends on the overall size of the holding and the relative suitability of the soil. There is very little rotation but as a general rule the gardener endeavours to alternate root crops with green vegetables and rhubarb. On the whole the growers do not lack equipment, most of them having their own light tractor or two-wheeled hoe; the number of tractors averages one to every twenty acres and on the smaller holdings there is a two-wheeled hoe for every five or six acres. Most of the growers also own a motor-truck or similar vehicle on to which the produce is loaded in the field for direct conveyance to the market.

Since much of the land is deficient in potassium and calcium carbonates, considerable quantities of potash, lime and other fertilisers such as phosphates and soot are required, although some growers use patent compounds. Fertilizers are generally the largest item of expenditure and may well amount of £100 a year on a holding of 30 to 40 acres.

The supply of labour is not in itself a problem. Regular workers, of which there is no real shortage, average about one per seven acres while seasonal labour, both male and female, is usually provided by the gardener's family. Less than twenty of the growers live on their holdings, which are often a number of scattered plots, but more than half of them live in Melbourne or King's Newton and all the rest have their homes within the parish.



The bulk of the vegetable produce is still sent to Derby, only ten miles distant, but with improved road transport, markets further afield have been tapped. Nottingham is the second largest market, followed by Long Eaton, Leicester, Loughborough and Birmingham, while a few growers even send to Stoke-on-Trent, Chesterfield and Sheffield. As a rule each grower supplies only one or two particular wholesale centres which he visits once or twice a week or even every day as certain varieties come into season. About two-thirds of all the vegetable produce is marketed in this way, the rest being sold either directly to retailers or through an agent.

Growers in the Melbourne district are liable to competition from at least two sources. The first is from large-scale vegetable cultivation by local farmers, whose common practice is to sow a considerable acreage of any hardy vegetable which has shown good returns in the past few years. The market gardener relies on making his main profits during the first week in which each variety comes into season and thereafter expects average returns, but if the farmer seizes the market the gardener may fail to dispose of his produce even at the lowest price and can then only use it as green manure. Moreover the farmer is subsidised whereas the gardener does not have this safeguard. The other source of competition is from more distant growers either in Lincolnshire and East Anglia or abroad, largely in the Low Countries, France and Italy. Except when crops are unusually early in the eastern counties, higher transport costs offset any real danger to the Melbourne growers. On the other hand, market garden produce is not tariff protected and foreign produce may enter the market up to a month before the home grown vegetables are ready, thereby capturing the highest prices and later undercutting the local-grown produce. Also, despite the general ability to undersell foreign competitors, growers have to face the fact that a large section of the public prefers the high quality well-packed imported produce.

#### PRODUCTION ON DIFFERING SOILS

It is interesting to compare the market gardening on the Millstone Grit soils with that on the Keuper Series. While it is almost certain that commercial gardening began on the former, there is now considerable rivalry between the two types and the rather more thriving cultivation on the Keuper in the east is probably due as much to certain soil advantages as to a slight superiority of situation and aspect. The Grit soil responds well to careful treatment, including manuring, and will always produce crops a little in advance of those on the Keuper Series but it is nevertheless considered a hungry soil and requires more frequent replenishment with fertilisers. Drainage through the ground is rather more rapid on the Millstone Grit; this tends to carry away the nutrients contained in the soil as well as leaving it more vulnerable to drought. Moreover, besides the patches of stony Boulder Clay which are generally avoided by the market gardener, the Grit soils are frequently pebble strewn. At least one grower with a holding of 30 acres near the Ticknall Road which has been cultivated for the last 25 years has experienced increasingly poor returns until it is now difficult for him to compete in the market.

On the Keuper Series there is a greater air of prosperity which in part at least is the outcome of slightly higher fertility. The soils are less coarse than on the gritstone and somewhat richer in mineral matter and

humus and this in turn has given rise to more efficient cultivation on rather larger holdings by owners who are possibly less conservative in their methods. On the other hand it can be argued that it is the more scientific gardening that has improved the soil. While this is undoubtedly true, it seems reasonable to assume that the initial impetus towards improved conditions came from the relatively richer soil. This however does not explain why the Millstone Grit soils were the first to be used for market gardening, although this was probably a result of their proximity to Melbourne itself and chance circumstances involving the breaking up of estates which provided land for the early growers.

It is almost certain that any further extension of the industry will take place on the Keuper soils of the Ramsley Brook valley, although the degree of expansion depends on economic circumstances beyond the growers' control. This tendency is however already evident, for individual fields offered for sale in this area are invariably bought by market gardeners.

#### PROSPECTS

Within the industry opinions differ as to the present degree of prosperity. Competition from local farmers in the past few years has caused anxiety among some growers, while for others the last few seasons have been distinctly profitable. In general however there appears to be reasonable confidence in the future. It is difficult to say whether with increased competition the price of vegetables and other produce can withstand the rising costs of fertilizers, equipment and petrol, yet it is on this somewhat delicate economic balance that the prospects for market gardening in the Melbourne district really depend.

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The writer acknowledges the generous help in the preparation of this study given by numerous persons concerned with or engaged in the market garden industry of the Melbourne district.

## EAST MIDLAND RECORD

### TOWN GROWTH IN THE EAST MIDLANDS

The 1931-51 intercensal changes in population reveal some interesting variations in town growth. The period concerned, an unusually long one because no census was taken in 1941, involved exceptional circumstances such as considerable boundary changes in the mid-thirties affecting many urban centres and the different forms of population movement caused by the war.

In general the largest towns of the region show only a modest increase e.g. Mansfield 11.5%, Nottingham 10.8%, Leicester 10.6%, Northampton 8.2%, Chesterfield 6.8%, Lincoln 4.8%, Grimsby 2.2%. Derby, from which a large overspill has taken place into the adjoining rural area, even shows a slight decline (0.9%). At the other end of the scale the numerous small market towns, ranging from 3,000 to 10,000 inhabitants, also show very slight increases, many of them remaining virtually static as they have done for decades past.

Places for which the largest increases are recorded, i.e. over 25%, fall into fairly definite groups as follows :—

- (a) This comprises the two metallurgical centres, the young town of Scunthorpe and the new town of Corby. The spectacular increase in the latter (946%) is quite exceptional for in 1931 Corby did not exist as a town. Its development resulted from the erection of Stewarts and Lloyds iron and steel plant in 1934 and the continued expansion of these works has promoted a typical 'mushroom' town, the development of which since 1949 has been undertaken as one of the official New Towns, the only example in the region. The parish of Corby returned a population of 1,596 in 1931; by 1939 the new town had grown to over 10,000 and by 1951 to 16,704; it is now over 20,000. The continued expansion of the steel industry at Scunthorpe has stimulated the further growth of the town, the population rising from 33,761 in 1931 to 54,245 in 1951, an increase of 60.7%.
- (b) Considerable increases have occurred in the form of overspill in both urban and rural areas contiguous to large towns without however, except in the case of Derby, causing a reduction in these towns. Around Nottingham this is particularly evident with large increases, admittedly due in part to boundary changes, occurring at Beeston and Stapleford (79.2%), Arnold (49.9%), Hucknall (30.1%), Carlton (29.6%) and West Bridgford (29.3%). All of these are fairly well built-up Urban Districts and combined with the city they give to Greater Nottingham a population of nearly 500,000. Leicester with substantial increases in Wigston (41.7%) and Oadby (30.2%) illustrates the same point on a smaller scale, as does Mansfield with an increase of 29.9% in the adjoining Mansfield Woodhouse Urban District.
- (c) Certain towns have experienced a substantial increase in population mainly on account of industrial expansion accompanied by inward movement. These include the two Leicestershire towns of Hinckley (34.6%) and Melton Mowbray (33.3%), though in both cases a portion of the increase is due to boundary change. Higham Ferrers (Northants) with an increase of 25.6% has had no boundary change.

It is of interest to note two other instances of industrial expansion affecting urban growth. These are Beeston and Stapleford (Notts.) and Long Eaton (Derbys.). Both are Urban Districts now seeking advancement to borough status, both having gained population from boundary extension. The gain was substantially greater in the case of the former which came into being in 1935 by the amalgamation of the Urban District of Beeston and the Rural District of Stapleford. The disparity is reflected by the intercensal increases, Long Eaton (22·8%), Beeston and Stapleford (79·2%) and by the 1951 population figures, 28,638 and 49,849 respectively.

- (d) The Lincolnshire coast resorts of Skegness and Mablethorpe and Sutton have increased by 37·6% and 37·3% respectively, due to some extent to an inward movement of retired people.

The present population of the East Midland counties is nearly three and a half millions, or 7·8% of that of England and Wales. In the region there are six County Boroughs with a combined population of just over one million. These are the following :—

<i>Population 1951</i>		
Nottingham	..	306,008
Leicester	..	285,061
Derby	..	141,264
Northampton	..	104,429
Grimsby	..	94,527
Lincoln	..	69,412

Of the 20 Municipal Boroughs, the largest are Chesterfield (68,540), Scunthorpe (54,245), Peterborough (53,412) and Mansfield (51,343), there being no other which even approaches 50,000 in size. Thus the aggregate number of persons concentrated in towns of over 50,000 i.e. 1,228,241, represents 36% of the total population of the region.

#### A NEW CENTRE OF OIL PRODUCTION

Except for a negligible quantity obtained some years ago from a bore at Nocton a few miles S.E. of Lincoln, oil production on a commercial scale east of the Trent began for the first time earlier this year. The site is at Plungar in the Vale of Belvoir 12 miles E.S.E. of Nottingham, on the Leicestershire side of the county boundary. Like the existing oilfield in Nottinghamshire the discovery and exploitation of the new supply has been undertaken by the D'Arcy Exploration Co., a subsidiary of the Anglo-Iranian Oil Company. The first well is now in production, yielding between four and five tons daily; and others are now being drilled. The first well was drilled to 3,000 ft. though oil was struck at 2,800 ft., residing in the upper sandstone beds of the Millstone Grit. The dome structure thus located is an independent one and not a continuation of the Eakring-Duke's Wood axis, the main source of Nottinghamshire oil some 20 miles to the north.

So far as can be seen at this early stage the crude from Plungar is suitable for the preparation of motor spirit and high grade lubricating oils, its detailed characters resembling closely those of the output from Kelham Hills near Eakring. Output from the new centre will be sent with that from Eakring to a refinery at Pumpherstons near Edinburgh. The reason for this lengthy haul involving a high freight charge is two-fold : firstly because the Pumpherstons plant is specially designed to treat crude with a high wax content, into which category Nottinghamshire oil falls,

and secondly because the refinery is no longer supplied to capacity with Scottish shale oil. Within a mile or two of the Plungar wells there are two railway junctions through which tank wagons can be moved to join the full trainloads despatched from Eakring.

The success at Plungar followed drillings nearby at Bottesford and Barkestone which is also regarded as a promising area. Much earlier a bore at Screveton, S. of Newark, was carried to a depth of 3,621 ft. without result. In the case of the initial bore at Plungar, water was obtained in quantity at 1,200 ft. and if oil had not subsequently been found this would have been a useful source of supply for several villages in the neighbourhood. While it is too early to predict the scale of commercial oil production, the prospects appear encouraging and the area may supplement substantially the output from the Nottinghamshire field. The latter has yielded a total of 750,000 tons since operations began in 1939, of which some 450,000 tons were produced during the war years. The output continues to make a useful contribution but it represents only a small fraction, probably about 0.25%, of the country's needs.

#### A LINCOLNSHIRE VILLAGE STUDY

However relentlessly present-day changes may press, our towns and villages are mainly an expression of the accumulated experience of centuries and a study of their development should make for a fuller understanding of their current problems. To become aware, in this age of planning, of how deep into the past the roots of a particular community reach and to trace the interwoven strands of events and ideas which have made that community what it is today, is part of the equipment required for determining what it shall be tomorrow. A recently-published study by Mr. A. E. Kirkby, entitled *Humberstone, The Story of a Village\** goes far to provide that equipment in respect of a parish in North Lincolnshire.

Humberstone parish lies a little to the south of Grimsby and reaches the Humber shore along a one-mile stretch between Cleethorpes and Tetney Haven. The village itself is sited on a low spur of boulder clay projecting eastwards across the parish from the main platform which flanks the Wolds. From this spur, which rises from 25 ft. to barely 50 ft. above sea-level the ground falls gently to flat marshland on all sides except the west. To the north and south the marsh is grassland, of which the North and South Ings have been meadowland from time immemorial, while towards the Humber it formed an area of saltmarsh known as the Fitties until 1941 when much of it was drained and ploughed. The boulder clay spur which offered a *dry-point* location for the village, provided almost the only arable land and thus in early times formed the geographical basis for a two-field system of agriculture (East and West Fields) which continued to operate until piecemeal enclosure took place in the 18th century. By the end of the 17th century however, there is evidence that the system was breaking down. Soil exhaustion was affecting production on the two main fields and the Newcroft (part of the southern fringe of marshland) was ploughed up to give a small additional arable field. Moreover the "Abbot's Manor" survey of 1608

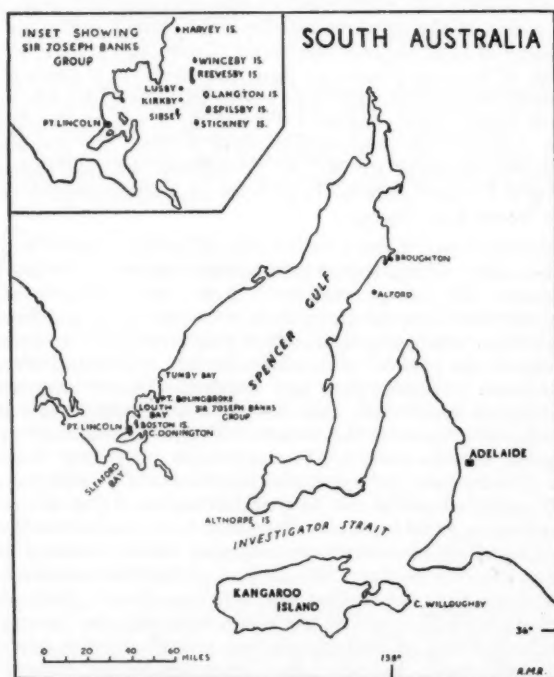
\* The author, a graduate of the former Nottingham University College, is Senior Geography Master at the Carr Lane School, Grimsby, and the book (196 pp. including maps and illustrations), published by private subscription in 1953, is obtainable from W. H. Smith & Sons, Ltd., Grimsby, price 17/6.

showed that a small amount of enclosure had already taken place. A plan of the village made in 1707 for the purpose of enclosure shows the close relationship between the contemporary land-use pattern and the physical conditions. Equally instructive is a comparison of this plan with that showing present-day field boundaries and field names in so far as the latter have been ascertained.

Humberstone remained a purely agricultural community until the early years of the present century when the first influx of residents from Grimsby took place. Since then the village has become largely a dormitory settlement having increasing contact with the town. Though some 1,600 acres of farmland remain in the parish, agriculture employs not more than 5% of the present population. A small brickworks using the local boulder clay is the only industry. The greater part of Mr. Kirkby's study however is historical rather than geographical and as such demonstrates how closely the story of one English parish reflects the main currents of our national history.

#### LINCOLNSHIRE EXPLORERS

Teachers in Lincolnshire could hardly adopt a more effective approach to the geography of Australia than to confront the class with a sketch-map like that given on this page. The multitude of Lincolnshire



Lincolnshire Names in South Australia

Other Lincs. place names in South Aust. (not shown on the map) include East Fen Deepes, Gosberton, Mareham, Partney, Pinchbeck, Quadring, Spalding, Sutterton and Wrangle. See A. B. Cook, *Lincolnshire Links with Australia*, Lincoln 1951.



names scattered around the shores of South Australia recalls the contribution made by Flinders and Bass to the exploration of these coasts between 1801 and 1803. Both were Lincolnshire men and it is evident that their homeland was much in mind as they proceeded with their charting. Besides the familiar place-names, Investigator Strait, which separates Kangaroo Island from the mainland, commemorates the name of the vessel commanded by Flinders. Many small islands and promontories around the entire continent are named after Flinders who must rank next to Cook as the greatest explorer of Australia by sea. It was Flinders who confirmed the appropriateness of the name Australia as a single term for the two divisions of the continent known in his day as New South Wales and New Holland. Bass Strait perpetuates the name of his fellow-countryman who in 1798 made a voyage of eleven weeks in an open boat from New South Wales, entering the stretch of sea between Tasmania and the mainland. Bass believed this to be a strait rather than a bay but the doubt was not dispelled until later on when he and Flinders circumnavigated Tasmania.

Flinders and Bass are representative of a special phase in Lincolnshire's long sea-faring tradition. The period of the late 18th and early 19th centuries saw much distress among the farming community in the county. In many parts first agricultural depression and then Parliamentary Enclosures led to a disruption of the old village life. The Enclosures caused numbers of cottagers and smallholders to be dispossessed. Some accepted their lot and remained on the land as farm labourers; others drifted away to the expanding industrial centres of the Midlands; many took to the sea and it was at this time that Lincolnshire produced a remarkable group of mariners who garnered fame in the field of discovery and exploration. Matthew Flinders came from Donington (Holland) and George Bass who took to the sea as a naval surgeon, from Aswarby. Edward Eyre, who lived at Louth, after voyaging in southern waters journeyed across Australia, Lake Eyre and Eyre's Peninsula being named after him. Sir John Franklin, one of the greatest of Arctic navigators was born at Spilsby and as a young seaman accompanied Flinders to Australia. Sir Joseph Banks, the distinguished naturalist, lived for a time at Revesby and sailed with Cook in the *Endeavour* on the epic voyage of 1769-70. Though there were others of note at this period, reference should be made to an earlier seaman, Captain John Smith of Willoughby. He is an almost legendary figure who at the age of twenty-six had already crowded into his career the experiences of a lifetime but who proceeded in 1606 to enter the great colonising project along the James River, the course of which he himself explored and mapped. The melancholy record of the first years is well known but with resource and phenomenal courage Smith saved Virginia in its infancy and made it permanent fully a decade before the Pilgrims made their landfall in Massachusetts Bay, where their followers were to build a second Boston.

#### GEOMORPHOLOGICAL WORK ON THE LINCOLNSHIRE COAST

The major phases in the post-glacial evolution of the coastal areas of Lincolnshire, with reference to the changing sea-level, have been established by Professor H. H. Swinnerton (1931, 1936). A. E. B. Owen (1952) has presented historical evidence of substantial coastal erosion in Lincolnshire since medieval times, related to a rising sea-level. This rise continues, and there remains a need for study of coastal changes from a geomorphological point of view, with the ultimate objective of

assessing the relative importance of factors responsible for the recent and current development of the coast between the Wash and the Humber.

Work was begun by F. A. Barnes and Cuchlaine A. M. King in 1950 in the area of rapid accretion at Gibraltar Point south of Skegness, where a considerable area of land has been gained from the sea since about 1840. In this vicinity dunes, mature and incipient salt marsh, shingle spit and storm beach features, together with a beach of complex character are available for study. A large scale map, surveyed by plane-table, and a preliminary discussion of each of these distinctive units were presented in 1951. The character of the beach in relation to the other features was revealed by a series of profiles levelled across the marsh, dunes and beach between Gibraltar Point and Skegness, while it was possible to relate salt marsh vegetation to slight differences in height.

Subsequent investigations at Gibraltar Point have been directed towards establishing the evolution of the area and clarifying the operation of various processes at the present time. Systematic boring has been undertaken in the mature marsh to throw light on its subsurface structure. The spread of vegetation in the new salt marsh has been studied by mapping the changing boundary of the plant associations in relation to height and surface material. Observations have been made on the movement of sand blown by varying winds in different situations. The shingle spit extending from the main angle of the coast has been repeatedly surveyed, with a view to determining the course of its development and its significance. Much light has been thrown on the processes at work on the beach by resurveying the beach profiles many times.

The intended extension of the study into the area of erosion to the north was hastened by the storm flood of January 31 and February 1, 1953. This provided an opportunity to examine the beaches in a denuded state and to initiate a series of observations to illustrate their recovery. Observations and surveys were made immediately along the whole section of coast between Gibraltar Point and Theddlethorpe. Beach profiles were surveyed at 24 places covering sections affected by the storm to varying degrees. It was possible to correlate beach profile, type of coast defence and damage on the basis of these observations. The results of these surveys and reflections on their relevance to the problem of the defences of the Lincolnshire coast were published in July 1953. The beach profiles have been relevelled at intervals of approximately four months and illustrate the recovery of the beaches since the storm.

While the local details of coastal development in this area are becoming clear, the wider controls are still matters for conjecture. The quantitative measurement of the volume and direction of movement of beach material under varying conditions is a vital problem for which no suitable technique has yet been devised. It becomes apparent that the nature and movement of the offshore sand banks is another important factor on this coast. Future work will be directed primarily towards resolving these two major problems.

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Research Station, Gibraltar Point, Lincs.*,  
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## HIGHER DEGREE THESES AND FIRST DEGREE DISSERTATIONS

### *Prepared in the Department of Geography*

In the University, Geography may be read as a subject in the Faculty of Arts, under the Board of Studies in Law and Social Science (Faculty of Arts) and in the Faculty of Pure Science. Since the award of the Charter to the University in 1948 all students taking an Honours degree in Geography have been required to submit a dissertation as part of their final examination. Only those dissertations and higher degree theses relating to East Midland subjects are listed below. *Bona fide* students or research workers may be permitted to consult them on application to the Department.

1950

#### DISSERTATIONS.

- The geomorphology of the Mansfield Plateau. A. Greenhalgh.  
 The urban morphology of Nottingham. D. C. Large.  
 The Trent Valley from the Erewash to the Dover Beck. A study in changing land-use. Jean B. Laing.  
 The physical geography, agriculture and settlement of the Upper Idle Basin, Notts. K. E. Johnson.

1951

- M.A. (*University of London*).  
 The economic geography of the Nene Basin grain milling industry. J. Smith.  
 M.Sc. (*University of Sheffield*)  
 Some contributions to the denudation chronology of part of the Middle Trent. K. M. Clayton.

#### DISSERTATIONS

- Transport developments in the southern portion of the Notts and Derbys. coalfield, 1750-1850. J. A. Birks.  
 The historical geography of Long Eaton, Derbys. J. M. Gummery.  
 The economic geography of Ilkeston. N. Turner.

- The growth of industry in the Middle Derwent Valley. Enid R. Whiteley.  
 The Manifold Valley : a geographical study. L. V. Pape.  
 The location of industry in Grimsby. A. J. Light.  
 The urban morphology of Grimsby : a study in town evolution.  
 J. D. Peart.  
 The economic development of the south bank of the Humber between  
 Immingham and Barton. D. Hurd.  
 Kettering : an urban study. A. G. Westley.  
 The agricultural geography of the Greet Basin. Elizabeth Betts.  
 Mansfield : its growth and industrial development. R. J. S. Wiseman.  
 The agricultural geography of the Dover Beck Basin, Notts. Mary P.  
 Boak.

1952

#### DISSERTATIONS

- Melbourne : a geographical consideration of a Derbyshire parish with  
 particular reference to market gardening. Margaret P. Leay.  
 The settlement and communications of part of South Leicestershire.  
 Margaret R. Sylvester.  
 An interpretative account of drainage in an area at the head of the Vale  
 of Belvoir with particular reference to its significance in the local  
 farming economy. A. Hull.  
 The Wolds of the Nottinghamshire-Leicestershire Border. Jean M.  
 Brown.  
 Some physical aspects of the coast of East Lincolnshire. D. N. Robinson.  
 Settlement patterns and population in the Till Basin (Lindsey), past and  
 present. D. R. Mills.  
 The economic character, distribution and location of industry in the  
 Mid-Northamptonshire industrial belt. J. D. Phipp.  
 The River Greet Basin : a fruit growing area of Nottinghamshire.  
 J. H. Wise.  
 A comparative study of Bunter Sandstone and Keuper Marl landscapes  
 in Notts. J. C. Pearson.

1953

#### M.A.

- An urban study of Loughborough. Gladys H. Wedlock.

#### DISSERTATIONS

- The Peak landscape. J. G. Mosley.  
 The town of Bakewell. Dorothy M. Roscoe.  
 Melton Mowbray : marketing centre and industrial town. D. F. Moulam.  
 The growth and industrial development of Worksop. A. J. Evans.  
 Newark : some aspects of its trade and industrial development.  
 G. G. Gibson.  
 The urban morphology of modern Nottingham. B. W. Seaton.  
 The industrial development of the Leen Valley, Notts. D. P. Parnham.

